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# BULLETIN OF THE NEW YORK ACADEMY OF MEDICINE

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BULLETIN OF
THE NEW YORK ACADEMY
OF MEDICINE

DECEMBER, 1942

# NEUROPSYCHIATRY IN WAR TIME*

GEORGE A. BLAKESLEE

Director, Neurology and Psychiatry, New York Post-Graduate Hospital

THERE can be no doubt that nervous and mental diseases always have been experienced by members of armed forces in all wars but it is only in very recent wars that a well-organized and specialized neuropsychiatric service was given the opportunity to serve as a component part of the medical department in any army, and have the privilege to examine and treat soldiers ill with nervous and mental diseases.

"It was during the Russo-Japanese War of 1904-1905 that the Russians developed the first army medical service in which mental cases were treated by specialists, both at the front and upon return to home territory. During World War I and just prior to our entrance into the war, the Surgeon General of the United States, having in mind the desirability of being prepared at the earliest possible moment to deal with the new and formidable problem of war neuroses, invited a committee of civilian neuropsychiatrists to Washington for a conference on the subject. It is interesting to note that the three members of the committee were from New York City.

The committee visited the army camps on the Mexican border to

* Read before the Combined Meeting of The New York Neurological Society and Section of Neurology and Psychiatry of The New York Academy of Medicine, October 6, 1942.

study the provisions made in the United States Army, as then constituted, for the diagnosis of, and the care and treatment of soldiers suffering from mental diseases.

A member of the committee visited Canada in quest of information concerning the management of the numerous problems arising out of the presence of mental and nervous disorders among soldiers.

Another member was sent to England to secure first hand, the most recent information as to the British and French methods of dealing with war neuroses in and near the theater of operations, to make observations on these methods, and to confer with medical officers in the British War Office.

The foremost recommendation in this report called for rigid exclusion of all insane, feeble minded, psychopathic, and neuropathic individuals from the forces which were to be sent to France and exposed to the terrific stress of modern warfare. By the adoption of an exclusion policy it was believed that the difficult problem of caring for mental and nervous cases in France would be reduced and military efficiency be increased.

Army regulations made no provisions for neuropsychiatrists and it was also recommended that the psychiatrists and neurologists be medical officers of the army. Soon hundreds of neuropsychiatrists were commissioned and recommendations made as to rank. These officers functioned to exclude the nervous and mentally unfit from military service. They were placed on duty at hospitals, camps, cantonments, posts, ports of embarkation, disciplinary barracks, both in this country and France. With the American Expeditionary Forces they coöperated in connection with combat troops, general and special hospitals, court-martials, classification boards and prisons."*

At the present time, in World War II, although the Medical Advisory Boards of the Selective Service System continue to function, practically all of the psychiatric examinations are made by psychiatrists of the Army Induction Boards, and frequently the final decisions made on registrants is rendered by the regular army, particularly by the qualifying officers in the determining board.

Neuropsychiatrists are assigned in the various camps in the United States, but I am not qualified at the present time, to state to what units or organizations neuropsychiatrists have been assigned in the American

* From *The Medical Department of the United States Army in the World War*, Volume X.

Expeditionary Forces. I am of the impression that the neuropsychiatrists assigned to the camps are overburdened whereas the average high school students could probably do the work that physicians are now assigned to do in the Draft Boards.

I have thought that it might be of interest and value to learn of the experiences of some of the neuropsychiatrists who served in World War I, of others who are serving in the present war, and of one who has had much experience as a consultant in a United States Veterans' Hospital. I have communicated with these men and in the following paragraphs present the substance of their responsive letters:

* * * *

Dr. Samuel W. Hamilton was one of the first commissioned neuropsychiatrists who served in the first World War. He writes that it happened to be for him one of those rare occasions when an amateur military man has a chance to express his preference. Not wanting the war to end without having seen something of it, he asked to be sent abroad early, and the order that called him to duty sent him abroad. He thereby missed the benefit of examining the men in the draft, which all of his friends say was a very valuable experience.

The experience at a British hospital, where the severe psychoneuroses were under treatment was valuable. Perhaps it could have been organized to be still more valuable. The only lesson that he could draw was that medical officers are not afraid to work, and that any courses given to them should assume their desire and their capacity to study earnestly the new problems. He wishes that more of our colleagues were in British and Russian hospitals now.

He spent about six months with a division. It was a fine division and the division surgeon was very pleased to have consultants in any specialty assigned to him and was ready to give them a free hand if they wanted to work. Of course they did. It was indeed a valuable experience. A number of the men who had been trained in the camps at home came over later and he could see that they were doing a better job as division psychiatrists than he was. This is another reason for giving our men stiff training at home. Thus far he has not heard that any of our colleagues in this war has been appointed a division psychiatrist, but he hopes that some will have that experience even though the division may be quite different in organization than in the last war. The same kind of men make it up and emotional problems will need the

same kind of attention. It is said that with the present type of warfare the organization of medical work at the front is considerably different. At any rate the need exists and he hopes our Army Medical Corps will meet that need. It may be remembered that the prize essay printed in the magazine *The Military Surgeon* on the future organization of the division left but two specialists in the division—the orthopedist and the psychiatrist. This essay was written by a man who as division surgeon had not been especially friendly to the idea of having a psychiatrist, but had lived to learn.

Late in July 1918 Dr. Hamilton went to an army corps. Historically, Edwin C. Zabriskie and he were the only corps psychiatrists. He bows to Dr. Zabriskie's superior ability in this as in many other matters—Zabriskie served two corps simultaneously and he served only one.

The work was very interesting as one and another division came into the corps. The corps consultant had to get acquainted with the division surgeon and some of his ranking aides and then make sure that the division psychiatrist knew what was expected of him and had a chance to do it. A quite well-intentioned division surgeon might locate the division psychiatrist at such a place that he would miss seeing a large part of the casualties. The corps psychiatrist was not confined entirely to administrative work, for there were corps troops aside from the divisions that came and went, and it was desirable to hunt up these corps troops, discuss matters with their medical officers and develop in them the same attitude toward mental casualties that the division psychiatrist was developing in his organization. The lesson that he would draw is that the army corps should have a psychiatrist. He needs to be very mobile and will have no difficulty in being very busy.

His last important assignment was psychiatrist to the Army of Occupation. The fighting was over now, but there were still psychiatric tasks to do. Since the fighting was over and the period of parades had come, it was necessary to remove from the divisions a considerable number of men who for various reasons could not parade well. Some of them were feebleminded; they had been fitted into various jobs that they could perform well, but now with regret they were called out and sent home. The division psychiatrist had this task and the army consultant again was responsible for seeing that there was opportunity to do the work rightly. Then there were army troops as well as corps and division troops and the army consultant was responsible for their mental

health. The army had hospitals and in two of them they set up neuropsychiatric units. Their work was studied and steps taken to relieve them of unnecessary obstacles. Arrangements had to be made also to send their patients to the coast under proper supervision. Obviously, every body so large as an army needs a psychiatrist even when it is static and much more so when it is in the field.

* * * *

Dr. Louis Casamajor who served as a hospital consultant in the AEF writes that the old fellows can reminisce about the last war ad nauseam but he cannot see to what good. He sees no benefit in writing to me about the AEF because he says I know more about that than he does. However, he can say something about the BEF.

When The Presbyterian Unit got with the BEF in Etretat no one there ever heard of a neurologist or psychiatrist in a military hospital. He took over a general medical ward and saw what neurological and psychiatric material they had for him on the side. The neurological material was mostly peripheral nerve wounds and there was important work to be done there but not much of it. Psychiatry was practically non-existent.

He remembers, however, an officer with psychiatric problems—a fine chap named Brooks of the Royal Engineers who came down the line with "shell shock." He was a typical anxiety neurotic who had blown up after three years in the line. Personally he was a fine fellow who had blown up after having been through a high grade variety of Hell. There were a series of psychotherapeutic talks in which the scare factor of his neurosis was shown. After about three weeks he went back to his company, in September 1917. "I got a letter from him in December of that year in which he said he had been able to help a number of men with what he had learned from us. He also remarked in his letter "If this bloody Army knew what it was doing they would have you up here with us instead of back there at the base." What he meant to say was that he believed that psychiatry was of more value at the front than in the back areas where usually it was too late. He was killed in March 1918."

* * * *

Dr. Frederick W. Parsons, who was division psychiatrist of the 1st Division, AEF, one of the finest fighting organizations in Europe, feels that it is fitting that neuropsychiatrists today draw on the experiences

of the last war even though the combat conditions are likely to be very different from what were experienced 25 years ago.

About all that can be visualized now is that the neuropsychiatric service will have to be adjusted to what is possible. It is doubtful if psychiatrists with the troops will have stable psychiatric facilities in which to work. In France, until the end was approaching, the war was one of fixed positions, making it possible to have one's facilities stabilized. It became known where help in neuropsychiatric cases was located and what was there provided largely depended on what the higher officers believed was desirable. Sometimes the intention of those who decided what, where and how much seemed largely devoted to thwarting.

One important opportunity for neuropsychiatric services in war time is the position of division psychiatrist. In theory he should promote the mental health of the whole division, now about 15,000 men. He is, in theory again, expected to spot, to treat and stiffen potential crack-ups and to receive first those who have actually broken; to repair the reparable and to evacuate those not likely to recovery speedily.

No reasonable person can expect one man to do all this. Even with the best help from the division surgeon, with the sincerest interest and assistance of the line officers, he can spot only a few, can help only a portion of those reported to him as becoming unfit, and relieve only a small percentage of those who actually collapse.

Under combat conditions a half dozen physicians in an advanced station may evacuate 1,500 casualties a day. The psychiatrist, if there, probably will be doing dressings, giving first aid, and assisting in the transfer to base hospital during every waking moment and the few mattresses on the ground cannot be devoted to the neuropsychiatrically disabled. The result is that with a mass of wounded men, the neuropsychiatric cases take a long ride to the rear, again to come into a crowded hospital with busy physicians first devoting themselves to those with obvious wounds. The physically indisposed and the neuropsychiatric cases come last.

It is fair to assume that similar conditions will be experienced in our troops when actual combat begins. It isn't likely that trench warfare with fixed positions held for months and sometimes years will be repeated. Then, the rear area could be a quiet zone and a base hospital 50 or 60 miles behind the lines was relatively safe. No realistic person

thinks now that the sick and injured will be permitted to convalesce in comfort.

It is likely that the conditions to be met will in no substantial measure approach those of the last war. Even then, without much official support (there were glaring exceptions), the neuropsychiatrists cannot say they met the situation fully and all they now have to do is to repeat the efforts of the last war. It behooves them to admit their failures. We can take comfort by realizing that the surgeons did not save all of their cases and pneumonia victims died under the care of the internists. Today surgeons have a better technique and the internists deal more effectively with pneumonia, and the neuropsychiatrists will do better with their cases if they have a chance to work with them. What opportunities will be afforded? Perhaps better than the last war as things may work out but for that hopeful outlook they do not have much to stand upon. All they can do now is to look back to 1918 and see what lessons may be drawn.

If one were to say that mistakes were made there would be no difference of opinion. When, however, one asks what mistakes were made, there might be a variety of responses. It is judged that many, perhaps all, would agree that there were men in the combat forces who never should have been there, men constitutionally predisposed to a neuropsychiatric calamity. They were bound to break and never should have been exposed to the strain. Substantial agreement would be had to the allegation that the neuropsychiatrists had but little official support from their immediate superiors. There were striking exceptions but many neuropsychiatric officers were merely tolerated. Then, early in the war, successes in the neuropsychiatric field in the AEF were not outstandingly impressive. Later they improved but by that time the end of the war was in sight and that in itself did more for the men than did the professional care which unquestionably was improving.

Dr. Parsons expects that most of us will say that one important mistake was delay in getting specialized care. If a neuropsychiatrically disabled person can lie comfortably in bed in a good base hospital with only the sympathetic care of a regular practitioner for two weeks, he is almost sure to be a total loss to the Army and of not much use to himself or his family. At the end of two weeks he will have consciously or unconsciously justified his presence in the hospital. Then the neuropsychiatrist has a job on his hands as you well know. Conspicuous success was had

in treating neuropsychiatric cases in a few huts within sound of the guns. There, a few hours after a neuropsychiatric upset while in the trenches, surrounded by men likewise disabled, the soldier had neuropsychiatric encouragement, a hot meal, a long sleep, and the next day was better. After a rest of a day or two, a substantial number could go back. All were bucked up by this speedy return and the soldier had not lost face. That lesson should not be forgotten.

So we at least know three mistakes to avoid:

1. The mistake of poor selection.
2. The mistake of official apathy.
3. The mistake of delayed treatment.

The mistake of poor selection, in the main, has been and is being repeated. Our country is large, the psychiatric resources though great are not evenly spread. Admittedly, in large sections there are but few physicians competent to give psychiatric advice. Generally these large areas are thinly settled so that they produce few recruits. The great bulk of our soldier man power comes from the North and Middle Atlantic Seaboard, from the rich centers of the Middle West and the socially minded Pacific Coast. Probably more than 75 per cent of our soldiers could have decent psychiatric screening. For the State of New York the selection is probably the best in the country and this group knows what is left undone. Poor screening at Induction Boards can be partially compensated for by careful weeding during the early weeks of training. Recently a plan was proposed whereby the non-commissioned officers make check marks against neuropsychiatric symptoms expressed in soldier's language, on a card which goes to the psychiatrists. There may be merit in such a plan, for the men themselves know who among their associates needs psychiatric attention. If the line officers encouraged the non-coms, some decent plan might be evolved.

Official apathy prevails and perhaps it is the fault of the neuropsychiatrists. Maybe they over-exaggerate the importance of neuropsychiatry in a war-torn world. It is possible that performance falls short of promise. So far as official apathy is concerned, they comfort themselves by realizing it is not getting worse. The tendencies will be toward a greater appreciation of the need for neuropsychiatric service and if they perform, full recognition will come.

Now, so far as concerns the mistake of delayed treatment of the battle casualties, they can leave that to those who know what the

battle conditions will be and in an Army scattered in four directions these will not be uniform. All they can do now is to hope that facilities will be provided and that the neuropsychiatrists have an opportunity to avoid the hazards of the first few days of neuropsychiatric disability.

* * * *

Dr. A. A. Brill writes that, notwithstanding all that we have been hearing about the increase of neuroses as a result of the war, he fully agrees with Kraepelin, Bleuler, and all the others who maintained that despite the great hardships, the most intensive psychic traumas, as well as brain injuries, there was no increase in the neuroses as a result of the war. It might interest you to hear how he came to this conclusion long before he heard and read what was said by these great psychiatrists.

"In May 1917, some months before we entered the first World War, an English army officer—a case of "shell shock"—came to me for treatment directly from the battlefront. He was accompanied to this country by a friend, who came with him to my office. Following one of the big "drives," the patient was found in an unconscious state under the debris of a building which was demolished by an explosion. Except for a superficial scar on the back of his neck, no organic injuries were found. Yet, for about two weeks he was in a semi-conscious mental state, and when this disappeared, he showed marked tremors, especially in his arms, and general anxiety. After about two months of hospitalization in France and in England, a military medical commission recommended that he take a vacation far from the scene of war, in Canada or in the United States. A member of the commission, a Dr. Russell, suggested that in the event he chose the States he should consult me in New York, I was quite flattered when he told me this, for I was still at an age when one is pleased by recognition from an unknown colleague.

"The patient was born in Scotland and brought up in Australia; he was 43 years old and married. He had been in the British Army for many years before the war, and as far as he knew, he was never neurotically ill. His main symptoms were marked sensitivity to sounds, tremors, and anxiety, which was still in a free floating state, although some of it expressed itself in phobias and in somatopsychic feelings. He was very timid about meeting people, so that for the first two months he spent most of his time in his room, leaving it only for meals and for visits to me. As he had only four months' leave, and

hence, could not be treated by psychoanalysis, I resorted to other psychotherapeutic measures to help him to get back to the front. After about two months' treatment, he showed considerable improvement and, encouraged by me, he put on his uniform and began to move about in the city. One evening in July, my family being out of town, I asked him to dine with me. After a few drinks he spoke more freely than he ever did in my office (for a quick transference nothing is more efficient than a good dinner with a little alcohol). In the midst of his talk he suddenly opened the back of his wristwatch, took a piece of paper out of it, and showing it to me, said, "I carried this with me for years." I was amazed when I read "Dr. A. A. Brill, 55 Central Park West," which was where I once lived. He then explained that a medical friend of his in Australia, who had corresponded with me, often spoke to him about my work, and one day after he had read one of my letters to him, he cut off my address from it and had kept it ever since. I readily recalled my correspondence with this Australian colleague, who was very interested in the problem of schizophrenia. Thus, I suddenly learned that this man had carried my name and address in his watch case for at least a year before 1914, and that he had thought of getting in touch with me long before Dr. Russell had mentioned my name to him. In brief, this patient had been neurotic for many years before the World War, and his friendship with the medico of his regiment was due to the fact that the latter was interested in mental mechanisms.

"After we entered the war, I had occasion to see many patients who were supposed to have become nervous and mentally ill because of their war experiences. In addition, I have been a consultant to the U. S. Veterans' Hospital No. 81 since its establishment, where I have studied numerous cases of war neuroses; all these observations had long convinced me that nobody becomes neurotic or psychotic as a result of hardships sustained in wars.

"Much good and poor stuff has been written about war neuroses since the last World War, the Spanish civil war, and since the beginning of this war, but judging by the selective service classification of 4-F, which seems to epitomize the sum of this knowledge, I must say that the results are poor to say the least. Thus, 4-F excludes every person who has ever had a neurotic or psychotic attack, or who is sexually abnormal. In the latter case the stress is laid on homosexuality. Let us consider the neurotics first. During the last war I observed a great many

psychoneurotics and some psychotics, as it were in action. Some had been under treatment until they entered the armed forces. Of those, some were conscripted and some volunteered. None of them suffered any breakdowns; most of them served with distinction. I can say the same of psychotics, especially of the manic-depressive type. I have in mind two cases—one volunteered while he was in a depression because he welcomed the idea of being killed. The other joined up while in a mild manic state. The former soon got over his depression and went through the war unscathed. The second one, a patient who was also seen by Dr. Floyd Haviland, later boasted to us that he had a wonderful time. As he put it, "It was just as if you went out shooting rabbits." Yet, when I first heard that those patients were in the armed forces, I was frankly worried; I wondered what would happen to them. Since the first World War, I have seen many neurotics and psychotics, who had gone through the war and claimed that they felt better during that time. Accordingly, since we entered this war, I have been guided by the following rule: All those who say that they are afraid to go into the army, or ask me whether they should go or not, I invariably advise against it. For experience has taught me that they cannot maintain themselves where strenuous effort is required. However, I have in mind three exceptions—men who came for treatment because they were afraid, and have joined up after a few months' treatment, and so far, are doing well. All of them have been advanced to commissioned officers. On the other hand, those of my former patients who wished to go, never asked my advice. I discovered it from parents or relatives, or if they called on me, it was to make sure that I would not stand in their way. So far, all of them are doing very well.

"I, therefore, object to the sweeping regulation that anyone who has ever suffered from nervous or mental diseases should *ipso facto* be excluded from the armed forces. Most neurotics make excellent soldiers. I might add that most excellent soldiers are neurotics.

"I feel the same concerning the exclusions of homosexuals from the armed forces. In the first place, it is practically impossible to enforce this regulation. I happen to know that during the last war there were many homosexuals in the armed forces, who were excellent soldiers, and I know that the same situation prevails also in this war. There never was an army or a navy, wherein there were not many homosexuals. An overt homosexual cannot make a normal man into a homosexual.

Anyone who knows the psychology of this sexual anomaly is well aware of this. Moreover, most homos are decent well-behaved individuals, who control their sexuality in the same way as the self-respecting heterosexual. If we had sufficient psychiatrists well-versed also in psychosexuality, there would be no need for classification 4-F."

* * * *

A member of this society, Norman Q. Brill, Major, M.C., who is at the present time Chief of Neuropsychiatric Service, Station Hospital, Fort Bragg, North Carolina, writes that perhaps the most outstanding experience he has had in his military psychiatric experience which now is of sixteen months duration, has been the discovery of the existence of a tremendous psychiatric awareness in field units as well as in hospital organizations, in line officers as well as in doctors. Military medicine seems to have far surpassed civilian practice in the willingness to recognize functional and mental disorders. Major Brill continues:

"This seems to be so different from everything I have read about World War I medicine. Pearce Bailey related how neuropsychiatry interfered with established military routine and order. He told about officers complaining that if specialists did not cease eliminating the unfit, there would be no army left. 'It was felt that training which transformed poor physical specimens into robust fighters could do the same for those who had nervous or mental disorders. Recommendations for rejection or discharge were often waived by line officers. Because the nervous and mentally unfit were greatly embarrassing the American Expeditionary forces, General Pershing had to urgently cable the Chief of Staff that more extensive effort be made to eliminate such men.'

"The situation now appears to be quite changed. Upon arriving at Fort Bragg and reporting for duty, I was ushered into the Surgeon's office and introduced with the remark "Here's a nut picker." This seeming lack of proper respect for a neuropsychiatrist was more than compensated for by a rather wholesome welcome from the General who arranged for me to be put to work promptly. I have not stopped working since.

"At present, we have five neuropsychiatric wards with a bed capacity of approximately 130. This represents a miniature state hospital and neurological institute. Four of the wards are 'closed' and are for psychotic patients. Four other men and myself constitute the neuropsychiatric section. All the men are well-trained and the work is shared

equally. I might add that the oft repeated complaint of men being misused and not assigned in their own specialties can receive no support here. Every psychiatrist regularly assigned on the post is practicing psychiatry.

"Nor are we in want for things to do. We are charged with thoroughly working cases up and disposing of them. While medical and surgical cases which require prolonged hospitalization may be transferred to general hospitals (ours is a station hospital of two to three thousand beds), we must dispose of all our patients locally. This means making arrangements with State hospitals, relatives, and veterans' hospitals. Informal staff conferences are held on problem cases and all psychotic patients are examined by a board of officers prior to discharge.

"In addition to the ward work, consultation service which is probably the more important, is rendered. Daily numerous consultation requests are submitted from all the other sections of the hospital. Before the pressure of work became so great, we would see many patients who complained of inability to perform duty because of flat feet. We quickly discovered that their disability was more often of psychogenic origin than of orthopedic origin and jokingly referred to these cases as "flat heads" rather than "flat feet."

"The cases of neurocirculatory asthenia, and there are many, are seen in conjunction with the cardiologist. We have more than our share of psychoneuroses of all varieties and descriptions, and it is interesting that once again the Charcot types of conversion hysteria are making their appearance. Bizarre gaits, hysterical convulsions and paralyses, amnesias, etc., constantly try our patience and skill.

"A majority of the many psychoneurotics and psychotics we are called upon to see, give a history of previous similar disorder prior to induction or enlistment. Their reactions do not appear to be specific for war, and in the relative quiet and peace of a training camp, far removed from the theatre of operations and areas of combat, numerous cases are seen which in World War I were apparently mistakenly called shell shock.

"One has a wonderful opportunity to observe the variations in "adjustment thresholds" of different individuals.

"It is understandable how men, without previous military experience, drawn from every conceivable walk of life, and thrown together and subjected to the same discipline and routine, in making such a

rapid and violent adjustment can break down. Nevertheless, it is interesting to witness the fact that many of these individuals, on questioning, frankly admit that they are no worse for being in the army—that they "have always been that way."

"We see numerous epileptics who truly arouse our sympathy. So unlike the psychoneurotics, these men almost without exception plead to remain in the army, and as if they had committed some crime, beg for another chance. One cannot help thinking about their sad plight and wishing for some cure for them. The epileptic personality so frequently mentioned, is not in evidence in these men. In between attacks they are good soldiers, conscientious and willing. Unfortunately, but not without reason, they must be discharged.

"Though we have seen a considerable amount, the organic neurologic disorders have been relatively rare. I have already told Dr. Brickner how, over a period of one year, we did not encounter one case of multiple sclerosis. Recently we have seen two or three. I can assure you that they were not overlooked and I hope not misdiagnosed, for I have been on the lookout for them. I doubt if their absence can be completely attributed to careful screening by induction boards, for all do not have expert neurologists and other cases with obvious organic disease of the nervous system have been passed through. For example, we have encountered some soldiers with Parkinsonism, several with hemiparesis and oddly enough, four cases of typical myotonia atrophica. There have been occasional cases of brain tumor, post-traumatic epilepsy, acute meningoencephalitis, etc.

"All this, however, was to be expected. What is unusual is the frequency with which our opinions are asked concerning disposition of patients and reclassification and special assignments of soldiers. It is gratifying to see how our advice is followed.

"Men who have committed serious breaches of behavior are frequently referred from field outfits for psychiatric consultations before charges are pressed—on the assumption that 'there must be something wrong with them.' It is this attitude which is encouraging for the future of psychiatry.

"Before a soldier is brought before a court martial, the officer investigating the charges is required to consider the prisoner's mental status, and observation and study is recommended when indicated.

"Non-medical officers are alert to abnormalities in behavior, mental

retardation and signs of nervousness. We need no publicity agent. All seem only too anxious to utilize the psychiatric facilities which are available. They have learned how much we can help them.

"The Surgeon General has stated that "The Army is in no sense a social service or curative agency. It is to be considered neither a haven of rest for wanderers, nor a corrective school for misfits, n'er-do-wells, feeble-minded persons or chronic offenders . . . men who present behavior problems in the civilian community will certainly present intensified problems in the service." How true this is!

"General Coburn, the Surgeon at Fort Bragg, remarked to me once, how important the psychiatric service was to the army. This indeed represents progress when one considers how in civilian life in some places, psychiatry is still struggling for a place in the sun in the medical world."

* * * *

My own experiences differed somewhat from those of the neuropsychiatrists just read.

On August 11, 1917 when active in civilian practice, orders were received to report immediately to the Medical Officers Training Camp at Fort Benjamin Harrison, Indiana, where specialists and general practitioners were assembled for intensive training.

The training at Benjamin Harrison proved invaluable in later adjustment to army life, in cantonments and in a combat division in the AEF.

Instruction was given in regular army tactics and manoeuvers, the function and duties at the many army hospitals, the actual erection of a tented Field Hospital, and intensive study of the School of the Soldier and the School of the Officer.

After leaving Benjamin Harrison, I reported to Dr. Hutchins who was chief of the neuropsychiatric service in the 81st Division at Columbia, South Carolina. At that time there was an extremely serious epidemic of epidemic cerebrospinal meningitis in camp, and although the disease stands on the borderline between general medicine and neurology, I was placed in charge and told that particular emphasis should be placed on the prevention of its spread. No opportunity was given, nor was there time to study the nervous and mental diseases in camp.

In a few months, upon my request, orders were issued assigning me to St. Elizabeth's Hospital in Washington, to study the nervous and

mental diseases, under the supervision of Dr. William A. White. The training at St. Elizabeth's was invaluable.

Working in Washington, and in close proximity to the Surgeon General's Office, I soon received orders to go abroad and report to Dr. Thomas W. Salmon, Chief Consultant in Neuropsychiatry of the AEF in France, for duty as division psychiatrist of a combat division. Upon reporting to Dr. Salmon at Savenay, France, he said he wished to talk with me and we entered a small room in a barracks, where he spent much time explaining the duties of a division psychiatrist and said that upon reporting to the division surgeon, my welcome might or might not be cordial, but to adhere to his, Dr. Salmon's, instructions.

His instructions were concluded with what seemed to me a psychological end rather than an approach, by stating that at the front I might not receive a scratch or I might have my head blown off.

Rank means much in the army. The division psychiatrist holds the rank of major and upon presenting my orders to the acting division surgeon, who also held the rank of major, the first information he desired was whether he outranked the psychiatrist and upon obtaining the information that he did by two weeks, we carried on quite well for the duration of the war.

The division psychiatrist was placed in charge of the nervous and mental cases in the Field Hospital, but it was soon realized that the greater number of cases were being sent farther to the rear and not to the Field Hospital. In Dr. Salmon's instructions to me, this was one of the conditions he wished stopped.

The division surgeon was consulted and privilege given to circulate in the division and converse with groups of regimental commanders and surgeons, company commanders, top sergeants, and other non-commissioned officers who were always in close contact with the men.

It was explained to these officers that all nervous and mental cases were to be seen by the division psychiatrist either in their units or were to be sent to the Field Hospital for observation and treatment, and none were to be sent to the rear unless so ordered by the division psychiatrist. Splendid coöperation was obtained with the result that over 40 per cent of the men ill with neuroses were returned to their combat units and fought as bravely as the men who had never experienced a neurosis.

Then there was the soldier who had fought hard and long and who

could always be relied upon by his company commander, but who began to eat and sleep poorly, to lose weight, and seemed to have slowed up and become less interested. He was becoming less efficient in his work, and mixed less with his buddies. On examination it was revealed that he was slightly depressed and extremely fatigued.

On one occasion the division psychiatrist collected about 200 of these men and decided to take them out of the division for a two weeks complete rest. He felt that they were the potential or preneurotic cases and soon would become quite fixed neuroses.

There was no room on the neuropsychiatric service in the Field Hospital for this large number of men and they were taken by the psychiatrist in trucks to Neurological Hospital No. 3, several miles to the rear. There was much eyebrow raising by the staff as they witnessed the men jump out of the trucks and await admission to the hospital. They were accepted on my diagnosis of mild depression and fatiguability. They received much needed rest in a quiet environment, mild exercise, excellent hot food, and good sleep. In two weeks time, they were back with their companies, refreshed and very grateful because they were again in excellent health.

Many years later, I was criticized by a member of the staff for having loaded the hospital with these non-neuropsychiatric cases, but in my opinion this was practicing preventive medicine in psychiatry at the front.

The Major General commanding the division, had a good insight into the neuropsychiatric problems in a combat force and on one occasion the general sent for the division psychiatrist to report to him personally at headquarters. The general was not entirely satisfied with conditions in certain units in the front lines and suspected that some of the officers were fatigued or nervous. He ordered the division psychiatrist to visit these units and study the conduct and behavior of the officers. He was to mingle, and mess with them, and obtain their opinions regarding the condition of the personnel in the units. Following the observations and examinations, of all things, the psychiatrist was to report in person to the general and dispense with all paper work. As a result of the examinations and report, high ranking officers, many of whom had served in the regular army for many years, were relieved of duty to rest in the S.O.S. This experience greatly impressed the writer, for he had learned that no one seemed immune to a war neurosis.

On another occasion during fierce combat in the Meuse-Argonne Offensive, a division psychiatrist was stationed at a triage or sorting station situated at a cross-roads, where ambulances could receive the wounded and ill and take them to various hospitals for treatment. It was necessary to write the diagnosis and destination on tags attached to the soldiers. The shelling of the cross-roads by enemy artillery was terrific, and this psychiatrist developed a coarse tremor of the hands of the greatest amplitude, both upon intention and at rest. This tremor did not cease until the day's work was over and he returned to the Field Hospital. The division psychiatrist who involuntarily demonstrated this tremor was myself.

The mild psychoses and war neuroses were treated by using persuasion, suggestion, almost constant personal attention, hot food, rest, and sedatives to induce sleep at night.

Many incidents which occurred in the division aided in the treatment and recovery of the neuroses. One in particular was on the day that Sergeant York, a soldier in the division, almost single handed, brought in his string of German prisoners. This remarkable feat rapidly circulated throughout the division, and the division psychiatrist lost no time in using it for therapeutic purposes.

After the armistice was signed, I was sent to Germany with the American Army of Occupation, to serve as Chief of Neuropsychiatric Unit No. 1, Evacuation Hospital, No. 16 at Coblenz. The hospital was new, modern, and had an excellent hydrotherapy department. After many months in fields and forests, I greatly appreciated the bathing facilities but was very conscious of the fact that I was now many miles farther removed from home.

The neuropsychiatric service was organized and directed as in large general hospitals in the United States. The most common psychoneurotic illness seen was a nostalgia with a mild depression or melancholia. Psychoses were treated. Epidemic encephalitis, cerebral vascular accidents, and alcoholics were also treated.

Therapy was not too successful because the hospital was only one block distant from the depot, and hospital trains arrived twice a week to remove the ill from Germany to the United States. The patients realized this, and I became convinced that the best therapy was discharge from the hospital with destination the United States.

When I received orders to return to the United States via Brest it

was necessary, in order to secure passage on a vessel, to assume charge of a group of neuropsychiatric cases, and take them to Army Hospital No. 1 in New York City. The types of cases were quite different from those examined and treated during actual combat. The group was made up of homosexuals and syphilophobias.

During the present World War II, as a member of a Medical Advisory Board I have disqualified for military service 80 per cent of the registrants examined. This high percentage of disqualifications is possibly the result of the experience gained in World War I.

In conclusion, I believe that the same neuropsychiatric problems will be met with in this war as were encountered in World War I, and that when ultimately the Allied Countries win the war, no small credit will be due the neuropsychiatrists who sincerely and conscientiously have performed the many duties assigned to them.

# PREFRONTAL LOBOTOMY*

## *The Surgical Relief of Mental Pain*

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AND

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PREFRONTAL LOBOTOMY[1] is the latest development in the field of psychosurgery, and thus far the most exact and controllable. It is the logical sequel to the local cortical extirpations carried out by Burckhardt[2] in the last century, to the transcortical incisions attempted by Puusepp[3] before the first World War, to the brilliantly conceived prefrontal leucotomies of Egas Moniz[4] and to the drastic prefrontal lobectomies[5] carried out now and again by European and American neurosurgeons. By psychosurgery we wish to designate surgical operations upon the anatomically intact brain, in the effort to relieve mental symptoms. Psychosurgery is thus a far different procedure from the extirpation of tumors, cicatrices and other lesions that are causing symptoms and whose removal is imperative for reasons of survival or health. Psychosurgical operations are comparable to operations upon the sympathetic nervous system or upon the pain pathways of the central nervous system, in that anatomically normal structures are sacrificed in the interest of the health of the patient. Psychosurgery relieves mental pain.

It may be well at the start to admit that considerable prejudice exists in relation to psychosurgery. For many it would seem unjustifiable (to use no stronger term) to sacrifice man's greatest heritage, the frontal lobes, merely in the interest of his greater comfort and freedom from fear and self consciousness. Moreover, a gloomy picture exists of the condition of the individual who has suffered any considerable loss of frontal lobe tissue. We were all brought up on the story of Phineas Gage, the railroad construction foreman of a century ago, whose crow-

* Read October 22, 1942 in the fifteenth Graduate Fortnight of The New York Academy of Medicine.

bar was blasted through the top of his head.[6] Some of us have seen the skull and the crowbar. Furthermore, we have followed with interest the studies on the functions of the frontal lobes from the time when Bianchi[7] and Ferrier[8] first called to our attention the changed personalities of the animals operated upon. The "tumor" studies followed, and then the "war injury" studies, and within the past decade there have been many cases of unilateral frontal lobectomy[9] and a few of bilateral frontal lobectomy[10] for tumor or for epileptogenic scars, with critical studies on the remnants of the patients' personalities. Out of these studies has come the picture of the "defrontalized dement," a being without shame and without ambition, lacking in all the finer qualities that make a man what he is, and debased to the level of the brute.

We do not wish to go to the other extreme and claim for patients who have undergone prefrontal lobotomy more than the average quota of virtues. Patients do lose something in the process, and we shall devote considerable time to the presentation of these defects. What we wish to emphasize is that in assessing the results of prefrontal lobotomy, the total behavior of the patient both before and after operation is critically studied, with whatever information can be obtained from the family and close associates of the patient. Just because the patient is relieved of mental distress and is again cheerful is no reason for calling the operation a success, even though a contented drone is more bearable than a complaining one. Enough patients now, have been returned to their homes able to manage them and to work for gain, who previously have necessarily been confined in institutions to make us optimistic about eventual results. It would seem that in certain cases the elimination of part of the activity of the frontal lobes has been of advantage to the total personality.

The problems in prefrontal lobotomy have gone beyond their first stage of hit-or-miss production of destructive lesions of the frontal lobes and waiting to see what the effect would be. With continued study of the procedure over the past six years, we have developed an operative technique that has certain merits of precision, and we have followed all of our 136 patients with periodic surveys, so that we know for these:

1. Where the induced lesions are.
2. What the results are to date.

It is well to conclude this introduction with a brief description of the operative technic.[11]

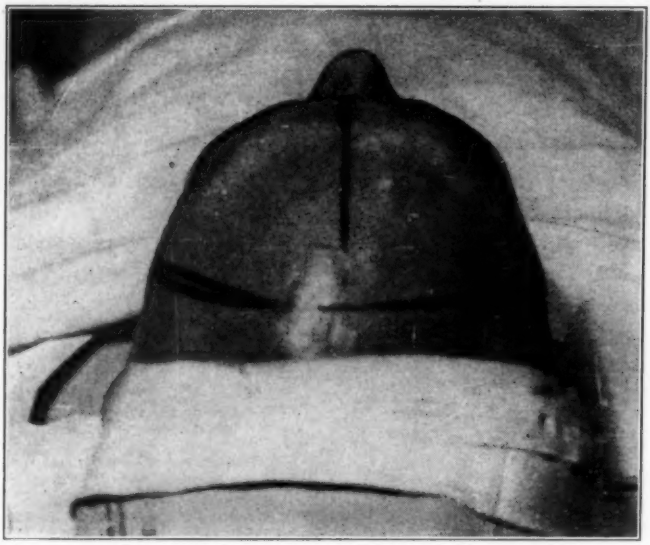

Fig. 1—Markings on the shaved and sterilized scalp indicate the midline and the coronal suture.

## Prefrontal Lobotomy

We prefer local anesthesia, since the patient can then report his feelings and ideas as well as respond to tests. Only in disturbed or apprehensive patients is a general anesthetic necessary. The patient's scalp is shaved to the vertex and the coronal suture and midline are marked out on the sterilized scalp. The coronal suture is then exposed on each side by incisions 4 cm. long, going down through skin and muscle, and burr holes are placed in this suture 6 cm. above the zygoma. This opening is enlarged by small rongeur bites in the suture, the dura is opened and an avascular portion of the exposed cortex is penetrated by a sharp knife. The field is then prepared for coöperation of the surgeon and neurologist in making the subcortical incisions (Fig. 1).

The neurologist (or in his absence, the surgeon's assistant) sits behind the surgeon with his eyes in the extended plane of the coronal suture. Since this landmark is so constant and so easily outlined, it is closely adhered to throughout every operation, although deviations may be indicated under special conditions. The surgeon first finds the

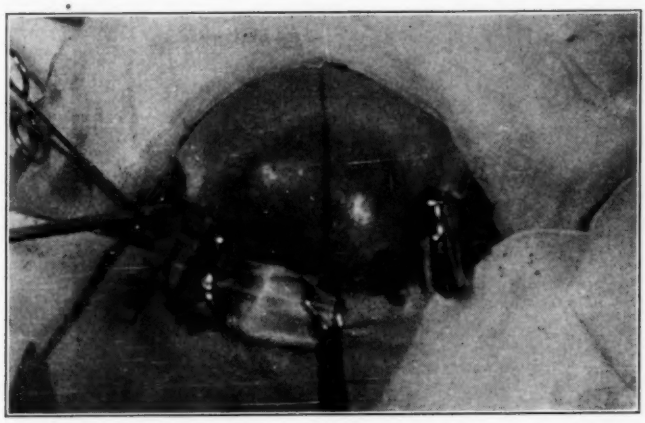

Fig. 2—A blunt knife, with hemostat attached, severs the subcortical white matter in the plane of the coronal suture.

midline by introducing a cannula directly toward the opposite opening. Resistance is usually perceived at a depth of 5 or 6 cm. If no change in resistance is felt, it means that the cannula has penetrated the knee of the corpus callosum; in which case the cannula is withdrawn and angulated toward the vertex until it impinges upon the falx cerebri, but always in the plane of the coronal suture. If the cannula enters the ventricle it is withdrawn and angulated slightly forward, but it does not seem to matter much if the incision does enter the ventricle.

A further landmark is found in the sphenoidal ridge by introducing the cannula downward toward the base of the skull. If the cannula penetrates more than 5 cm. it is probably behind the sphenoidal ridge and in the middle fossa, a dangerous area from the standpoint of bleeding. In such cases, reëxamination of the markings is advisable, since it is imperative to keep the incisions as close as possible to the plane of the coronal suture.

When the surgeon is satisfied with his landmarks, he clamps a hemostat on the shaft of a blunt knife (we use Killian's nasal septum periosteal elevator) and introduces the instrument to a depth short of the midline (beware the anterior cerebral artery!) and begins the fanlike incisions in the frontal lobe (Fig. 2). During this procedure the neurologist guides the surgeon, keeping the knife and the hemostat both in

Fig. 3A

Fig. 3B

Fig. 3A & B.—Lateral (A) and frontal (B) roentgenograms showing the location of the lobotomy incisions.

the plane of the coronal suture, by means of constantly correcting the surgeon's tendency to deviate from this plane. The depth of the incision must be judged by the surgeon, any increased resistance being the signal for withdrawing the instrument as a precaution against lacerating an artery. Once the primary incision has been made, it is safe to deepen the incision by radial thrusts of the knife that will push any intruding artery before it and at the same time reach the more peripheral parts of the white matter in the frontal poles.

The upper and lower half of each frontal pole is thus transected subcortically, or in another manner of speaking, the 4 quadrants of the frontal lobes are sectioned. Bleeding is minimal unless the cortex is trespassed upon. At the end of the operation, iodized oil is introduced into the depths of the incisions for roentgenographic control (Fig. 3).

Secondary operations are not infrequently necessary. In some cases, if the roentgenograms show that the mesial portions have been missed, the incisions are reopened and the knife plunged deeper. In others, new burr holes are placed in the coronal suture or 1 to 2 cm. behind it and 3 cm. lateral to the midline, and fresh incisions made in the white matter of the superior frontal gyrus medially and laterally, to connect with the previous incisions, thus insuring more complete subcortical amputation of the frontal poles.

Shock is minimal and complications are few. The patient is able to stand and walk within an hour after operation, will even offer to get off the operating table and walk back to his room. Such offers are firmly declined! As soon as the stitches are out, he is encouraged to sit up and in a week or so to walk about the hospital. He can usually be discharged in ten days. We mention these facts in order to emphasize the mild effects of lobotomy as compared with lobectomy.

The mental state of the patient alters abruptly with the completion of the incision of the fourth quadrant, irrespective of which quadrant is sectioned last: upper, lower, right or left. Even with three quadrants incised, the conscious patient is still oriented, can carry out intellectual problems of considerable complexity, and, although quieter, may still report anxiety or distress almost as great as before operation. In a matter of seconds after incision of the fourth quadrant, the patient becomes unresponsive, disoriented, confused and is freed completely from his anxieties. Pulse and blood pressure fall rapidly to normal, the extremities become warm and pink, flushing and sweating occur over the ex-

posed forehead and the patient appears to go quietly to sleep. Some patients are more lively and engage the neurologist in lively and sometimes humorous conversation or even sing, on request, some wellknown song, say their prayers and so on. But they are unable to recall anything concerning their immediate surroundings, and even when the skin sutures are being placed, may deny that they have been operated upon. This disorientation is so characteristic that it is used as a yardstick for satisfactory operation. While it does not always occur on the operating table, if it is not present on the first postoperative day, it is likely that the operation will be a failure and that the preoperative symptoms will return within a short time.

### Postoperative Condition

The first few postoperative days are marked by phenomena that are quite peculiar to prefrontal lobotomy and are far different from the usual occurrences observed following most intracranial operations. There is no discomfort beyond slight headache, the fever may reach 102° F. for a day or two, the pulse and blood pressure are usually undisturbed, and aside from vomiting and urinary incontinence, there is little of note on the clinical chart. Patients are often reading, or rather, scanning newspapers or magazines on the second day, and they play with objects such as the bed light or the bell cord, or pick at their bandages by the hour. We have found that a rubber doll will absorb a lot of attention and divert it from the bandages. The appetite returns by the third day and the sphincters usually come under control within that same period. By the end of a week orientation returns, the patient still spends a good deal of time in relaxed idleness, and responds pleasantly when aroused. There is no aphasia and no ataxia, the only neurologic signs noted during this early period being a smoothing out of the facial expression, plateau type of speech and incontinence. A fleeting Babinski sign may be found, but seldom reflex grasping. Patients who have been sick less than a year usually admit freely that their worries and depression have lifted; those who have been sick for a long time will continue the same complaints if they are asked about them, but without the emotional intensity that marked the preoperative condition. Not infrequently, there are witty replies and a dash of profanity. Restlessness, talkativeness and singing are occasionally noted, but disturbed behavior is quite uncommon. With the beginning of the second week the

A B C

Fig. 4—Characteristic alterations in facial expression following prefrontal lobotomy. Schizophrenic of four years institutionalization. A. Before operation. B. Five days after operation. C. Six months after operation.

inertia clears, or the hyperactivity dies down and the patient is allowed to go home or to some institution for convalescent care (Fig. 4).

The convalescent period may last but three weeks or it may last for a year or more, depending upon the chronicity of the case, the operative success, the previous behavior of the patient and so on. It is during this period that the patient is learning to readjust to living conditions with an altered personality, and also bringing that altered personality into line with the accepted norms of his group. It is not always an easy task, either for the patient or for the family.

## Social Behavior

The individual who has undergone prefrontal lobotomy is different from his prepsychotic self, although some indulgent families do not recognize the difference. He is apt to be more indolent, although some patients are very industrious; he is outspoken, saying the first thing that comes into his head rather than waiting an instant to judge the effect his response will have upon his audience. Patients acknowledge being hasty, undiplomatic, tactless. There is a certain directness of reply, maybe couched in the vernacular, that arrests the attention of the listener. When patients have said or done something that has undesirable con-

TABLE I

STATUS OF PATIENTS FOLLOWING PREFRONTAL LOBOTOMY

| *Disease* | *No.* | *Regularly Employed* | *Studying or Partially Employed* | *House-Keeping* | *At Home* | *Institution* | *Dead* |
|---|---|---|---|---|---|---|---|
| Involuntional Depressions | 62 | 6 | 4 | 27 | 11 | 6 | 8 |
| Obsessive Tension States | 30 | 12 | 4 | 5 | 7 | | 2 |
| Schizophrenias | 31 | 4 | 7 | 4 | 11 | 4 | 1 |
| Psychoneurosis | 8 | 4 | | 2 | | 2 | |
| Undifferentiated (Schizoid) | 5 | 1 | 1 | 1 | 1 | 1 | |
| Totals | 136 | 27 | 16 | 39 | 30 | 13 | 11 |

sequences, they are genuinely sorry and often apologize. The emotional reactions are brisk, but shallow and short-lived. Patients laugh more, and flare up in petulance, but the storm is over almost before the family can prepare for it. There is none of the brooding melancholy, the hurt feelings, the grim silences. Consequently these patients can be treated a good deal like children, with affectionate references to their irresponsible conduct. They harbor no grudges.

The intelligence is intact. This is shown not only by formal tests, but also by the abilities as shown in everyday life and the working out of individual problems in occupation. The use of the intelligence is quite varied, however, depending not only upon its original quantity, but also on its training and more particularly upon the residual of self-consciousness and ambition that remains to the patient. Very complete subcortical amputation leaves the patient permanently crippled as far as effective use of the intelligence is concerned. Inadequate operation permits the return of the emotional distress that prior to operation prevented the patient from making effective use of his native endowment. A satisfactory operation relieves the misery and leaves the patient with his intelligence not only intact, but freed from the bonds of linkage with the self. We have taken particular pains to ascertain the occupational adjustment of our patients (Table I), and find that the majority are no longer dependent but are usefully even if not gainfully employed. When it is recalled that many patients in the younger schizophrenic

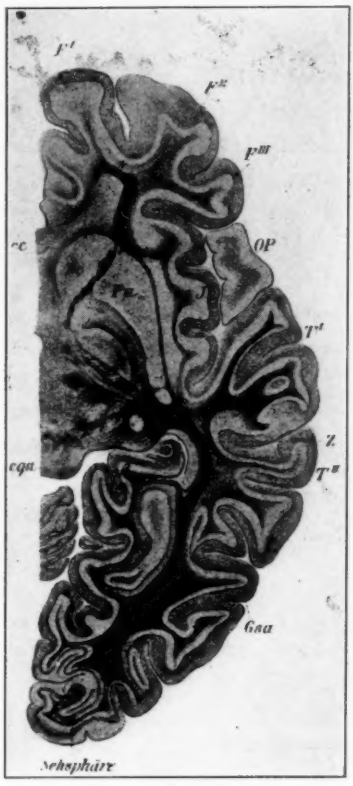


Fig. 5—Anterior thalamic radiation ($\frac{2}{+}$) in the 4 months child. This thalamo-frontal fasciculus becomes myelinated at a time when the association fibers are still immature [From Flechsig[12]].

group have never had jobs, and that the oldsters had retired, this record is not bad. Indeed, with two exceptions, patients who were working shortly prior to operation have been able to return to their employment.

The social behavior, then, is usually quite adequate, and the minor deviations are noted chiefly in hastiness and laziness neither of which is beyond the limits of normal, although both are novelties when the prepsychotic condition of the patient is considered. Teasing, exuberance, vulgarity, extravagance, gluttony and childishness are of uncommon occurrence after the convalescent period is past.

## Modus Operandi

As was mentioned in an earlier section, iodized oil is injected into the incisions at the end of operation for roentgenographic control. Furthermore, we have had the opportunity to examine a few specimens post-mortem from successful and unsuccessful cases. As nearly as we can judge, the successful incision cuts through the white matter of the frontal pole just in front of the anterior horn of the ventricle and the genu of the corpus callosum. It remains strictly in the frontal lobe, but may cut slightly into the sylvian fissure in its anterior extension. The white matter is not completely interrupted, there being bands of fibers of considerable size all around the fan-shaped incisions. Study of the architecture of the frontal lobe connections in relation to these incisions demonstrates that some fibers of the corpus callosum, some of the superior longitudinal and inferior longitudinal fasciculi and the occipitofrontal fasciculus have been interrupted.[12] The fasciculus uncinatus appears to escape. Most importantly, we believe, the anterior thalamic radiation is more or less completely cut across at this level, and the fasciculus cinguli is sectioned in some cases (Fig. 5).

We have been unable to detect retrograde alterations in the cells of the cortex of the frontal pole. On the other hand, the cells of the nucleus medialis dorsalis of the thalamus show important degenerative changes, which increase directly with the extent of the lesion in the frontal lobe. This is the nucleus that projects to the frontal lobe as shown not only by animal experiments, but also by myelinization studies, and even by gross dissection (defibrillation)[13] of this part of the brain (Fig. 6). In summary, the operation of prefrontal lobotomy works through interruption of the system of fibers running from the thalamus to the frontal pole, without disturbing to any considerable degree the organization of the cerebral cortex. That some general shrinkage takes place in the frontal poles is evident in the gross specimens and also in the encephalograms taken on patients a couple of years after prefrontal lobotomy. The atrophy is slight in comparison with Pick's disease. The integrity of cortical activity is confirmed by the relative normality of most electroencephalograms taken some months after operation (Fig. 7).

A number of intelligent patients who have been able to furnish us with the results of their introspections have helped us to build up a certain series of ideas in regard to the effect of these incisions. Most im-

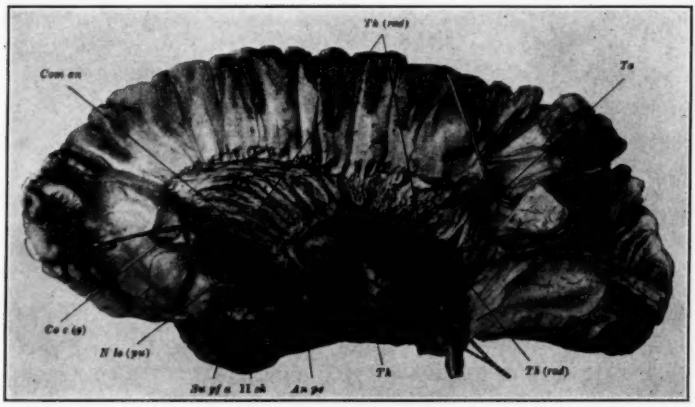


Fig. 6—Defibrillation preparation of adult brain showing anterior thalamic radiation [From Hultkrantz[18]].

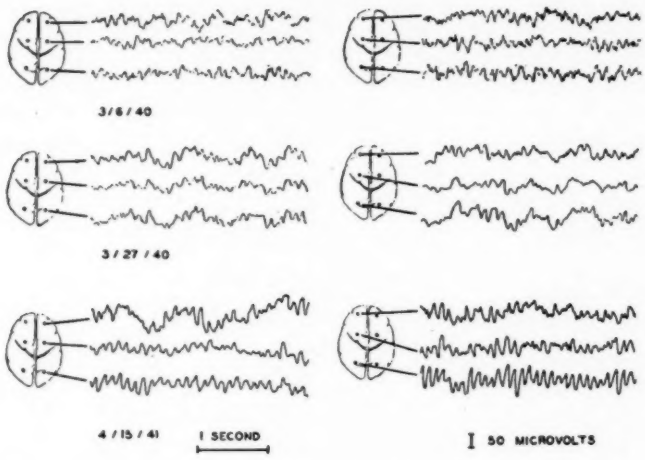


Fig. 7—Electroencephalograms from a case of chronic agitated depression [Kindness of Doctor Robert Cohn[1]].

portant among these is that prefrontal lobotomy diminishes the interest that the patient takes in his own feelings, sensations, reactions and ambitions. At the same time, there is a vivid interest in things outside himself. All tests show this trend toward extraversion. The patient enjoys life because he no longer suffers from indigestion; he is tactless because he no longer considers the consequences of an inept phrase; he is indo-

lent because he no longer is driven to attain that ideal of the self that he originally set in life. It is a very personal reaction, and also, as far as we can judge, almost entirely an emotional one. Patients know that their clothes are too tight, but they continue eating; they know that their tasks weigh too lightly upon them, but they prefer to read the comics; they know that their profanity is offensive but they do not care to bridle their tongues. As one man said of his wife: "She's so full of don't-give-a-damnness." The operation of prefrontal lobotomy would seem to produce its effects by divorcing imagination and affect *as they relate to the self*. Imagination and affect are both lively but they are turned outward rather than linked to the individual himself.

In certain previous studies we[14] have called attention to the function of foresight as being an important one carried out by the frontal lobes. We have observed this function badly disturbed for a period of time following operation, and then return. However, foresight in the recovered patient seems to turn much more to external things than to internal. This is shown in the successful occupational adjustment of patients whereas in their interpersonal activities, the qualities of abruptness, sauciness, tactlessness, and occasional lofty intransigeance may furnish a startling contrast, particularly to the people who knew these patients previously as reserved, dignified, sensitive people. Patients know that they have behaved foolishly once the act is committed, and they may apologize for it but they cannot seem beforehand to form a mental picture of how they will appear after the act is performed, and even if they can, they do not have the emotional component that will restrain them altogether from saying the first thing that comes into their minds. We have often advised these people to get into the habit of counting ten before they speak, but they seldom get beyond five. It must be said, however, that their words and acts, once they have recovered their balance, seldom give offense. They are taken as ingenuous expressions of enthusiastic personalities.

### Prefrontal Lobotomy and Psychopathology

Prefrontal lobotomy reduces in greater or lesser degree the intensity with which the individual regards himself. Stated more succinctly, the operation bleaches the affect attached to the ego. Whether this is a good thing will have to be determined by examination of the relationship of these two functions in the sick individual rather than upon

theoretical grounds as related to the normally functioning personality.

The mentally sick individual is fundamentally a person whose ideational activities revolve largely around himself, whose interest in the outside world is more or less markedly restricted, and whose affective experiences largely dominate his behavior. The hypochondriac shows this just as clearly in the somatic field as the paranoid does in the social field. The obsessive thinker may have insight into the falsity or foolishness of his ideas but he is just as unable to control them as the schizophrenic is unable to control his hallucinations. Indeed, we have arrived at the opinion that it is not the ideas that matter; anybody may have the most abnormal ideas and still retain his mental health. It is the *fixation* that counts. When an idea becomes fixed, it is no longer harmless and may produce serious results. We have drawn the comparison of such fixed ideas with the sensitized photographic film. When light falls on such a film through the lens of the camera, there is a certain physical alteration in the silver emulsion that cannot be detected until a reducing agent is applied. Once the developer acts, the image is brought out. If the developer is allowed to act for a long time, the silver is all reduced and the image fades back into obscurity. If, however, at the proper time, a fixative is applied, the image remains in spite of further light and further chemical reduction. It is the *fixation* that causes the image to persist.

Now, in the case of abnormal ideas, as was said before, anybody can have them and still remain normal, but if such ideas become fixed, they have not only permanence but also noxious potentialities. And, if we are correct, it is emotion that fixes the ideas. Further elaboration of pathologic ideas consequent upon the fixation involves such phenomena as delusions, obsessions, compulsions, states of tension, suicidal ideas, and, through possible exhaustion and independent "firing" of different cortical areas, to hallucinations, stereotypy, mannerisms, verbigeration and all the welter of schizophrenic symptomatology.

We do not insist upon acceptance of this concept of elaboration of psychotic symptoms, but it is quite noteworthy that prefrontal lobotomy is followed by loss of interest (affect!) in the hallucinatory and delusional experiences as well as in the bodily sensations, obsessions and so on, even though these phenomena persist for a time. As one very intelligent patient expressed it, "The sensation has moved from the center of my attention to the periphery." The cutting of the thalamo-

frontal radiation has thus deprived the ideational activities of their power to distress the patient. He is no longer affectively observant of his inner experiences and can therefore turn his attention to happenings in the outer world. The same pathologic ideational activities persist for a longer or shorter period, and the motor manifestations are brought under control even more slowly, but the bleaching of the affect has acted to return the ideas to the misty obscurity of the unimportant.

One might say that through the operation of prefrontal lobotomy, the destructive imagination of the patient is reduced to the point where he can again live at ease with himself and that the constructive imagination is relatively intact as far as external things are concerned. The great reduction in the consciousness of the self, however, renders the social readjustment of the patient a difficult matter at times, precisely because of his lack of concern about himself. Since it was his concern over himself and his own situation that seemed in large measure responsible for the mental breakdown in the beginning, the operation represents a radical attack, literally as well as figuratively, upon his psychosis. Furthermore, the disparate effects upon the patient and upon the family are apt to be of some moment in certain patients. If the patient is relieved of his burden of psychosis to the extent that his ebullience becomes a matter of uneasiness and hardship to the family, the result, from the social standpoint, leaves something to be desired.

We have to estimate the prepsychotic behavior of the individual before going ahead with the operation. Patients who have shown aggressive, psychopathic, criminal and alcoholic traits are refused operation no matter how clamorous they are, on the ground that their behavior after operation might be too offensive for social tolerance. Unfortunately for their families (the patients are always pleased) some cases have slipped by us without sufficient preoperative estimation and have proved troublesome problems. Also, we believed on theoretical grounds that alcoholics, if they were relieved of their states of tension would become good citizens. A couple of bitter experiences have taught us that prefrontal lobotomy is no cure for alcoholism. However, only one patient has developed alcoholism following prefrontal lobotomy.

## Results of Prefrontal Lobotomy

The tabulated results of prefrontal lobotomy (Tables I and II) may be viewed as too optimistic, particularly after the foregoing discussion

TABLE II

RESULTS OF PREFRONTAL LOBOTOMY

| *Disease* | *No.* | *Results* | | | *Deaths* | |
|---|---|---|---|---|---|---|
| | | *Good* | *Fair* | *Poor* | *Operative* | *Subsequent* |
| Involutional Depressions | 62 | 48 | 10 | 3 | 1 | 7 |
| Obsessive Tension States | 30 | 22 | 4 | 2 | 2 | |
| Schizophrenias | 31 | 21 | 5 | 5 | | 1 |
| Psychoneurosis | 8 | 6 | 1 | 1 | | |
| Undifferentiated (Schizoid) | 5 | 1 | 3 | 1 | | |
| Totals | 136 | 98 | 23 | 12 | 3 | 8 |

of the erratic behavior of the patients as described in previous sections. On the other hand, the figures include a number of patients who were operated upon during the first year of our endeavors (with the inadequate Moniz technique) and recent results have shown improvement. Moreover, with the passage of time there is often further improvement in the social adaptation of the patients, even through the third and the fifth year. This is in striking contrast with the results reported from the shock therapies, where relapses are not uncommon.

The factor of choice of patients is obviously important. During the first years, the emphasis was upon the involutional psychotics, and few schizophrenics were chosen for operation. Then, as relapses occurred from insulin and metrazol shock therapy, prefrontal lobotomy was employed in some of these cases. The patients selected were those whose families could afford rather satisfactory aftercare, and the majority of patients had not been institutionalized over any long period. It is not to be expected that results similar to ours could be obtained in chronic institutional patients, although we have noted some strikingly successful instances in patients hospitalized for more than five years.

It will be seen from the figures that the most successful cases are classed as obsessive tension states, with or without compulsions. These patients are intelligent and have considerable native energy drive, and they have not become dissociated. However, they are apt to be slow in making a satisfactory social adaptation because of the tendency to

A

B

Fig. 8—Photographs of a patient with agitated depression of eight years duration. (A). Before operation. (B). One year after operation.

aggressive behavior. In this connection, I may quote a paragraph from a letter received from the father of a patient: "A sense of gratitude, approaching mild elation is very noticeable, that his old difficulties are now gone forever. He speaks of getting married sometime and having children. Better judgment is also manifesting itself. He is not quite the

same David he used to be and probably never will be. With the passing of the intense, subjective emotionalism, a little of the good might also be lost, but this is of little moment, for a self directing hopeful personality is emerging, and this means everything."

The patients suffering from involutional depression are very satisfactory as a rule, although quite a number of them remain at home without useful occupation. In these cases, the illness has often led to retirement from business or domestic responsibility some time previous to operation, and the patients remain in retirement. We are particularly interested in relieving these patients of the burden of an overworked conscience, believing that even if they are unable to resume their former responsibilities, they deserve a modicum of comfort in their advancing years. It may be argued that these patients respond particularly well to shock therapy and that prefrontal lobotomy is unnecessarily radical. Shock therapy has been tried unsuccessfully or with relapse in most of these patients. The others have been of the type that in our opinion would not respond satisfactorily to shock therapy (Fig. 8).

As far as schizophrenics are concerned, the results leave much to be desired. This is true, however, of any treatment with which we are familiar. The surprising thing is that so many of them have been able to get along outside of an institution even if not usefully employed. The patients in the other groups are too few for any valid conclusions.

## Summary and Conclusions

1. Prefrontal lobotomy interrupts the connection between the frontal lobe and the thalamus, thereby reducing the emotional reactions of the patient as regards himself. This loss of painful self-consciousness in the psychotic patient is followed by reintegration of the personality with the ideational activities directed outward.

2. Intelligence is unharmed, but the application of that intelligence to the interplay of social and personal influences concerning the individual himself is diminished and in some patients results in indolence and lack of tact.

3. Many patients are able to reach their prepsychotic level of occupational adjustment. Some do even better.

4. Failures are due to:

a. Inadequate operation. This may be corrected by a secondary more complete lobotomy.

b. Too extensive operation. It is better to cut too little than too much.

c. Inadequate evaluation of the aggressive traits of the patient previous to the development of his psychosis.

d. Emotional deterioration. When the psychotic patient has given up the fight, it is probably too late for psychosurgery.

5. Old people whose lives are a burden to themselves by reason of psychosis are particularly good subjects for prefrontal lobotomy because of the serenity of disposition that follows operation.

6. Best results are obtained in obsessive tension states. Good results are obtained in involutional depressions. Fair results are obtained in schizophrenias. Poor results are obtained in alcoholism.

7. Finally, prefrontal lobotomy is comparable in its effects with the neurosurgical operations directed toward the relief of pain; only in these cases it is mental pain that is relieved.

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# BRAIN ABSCESS*

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IT IS the intention of the author to present this paper in ordinary everyday language, having in mind the multiple interests of this audience in contrast to a group more specifically interested in neurology and neurosurgery.

A brain abscess may be located in the cerebrum, cerebellum or brain stem. This paper concerns itself only with those in the cerebrum and cerebellum. An abscess may be termed acute or chronic, for the sake of discussion, although the surgical definition of a true abscess carries with it the meaning that the lesion is circumscribed and walled-off. In the beginning of the process, the condition is that of localized encephalitis regardless of the method of introduction of the infecting organisms. There is an inflammatory leukocytic infiltration with edema. The surrounding brain substance becomes softened, breaks down and necrosis ensues. The necrotic area liquifies and becomes a small "core" of pus and detritus contained in an ill-defined cavity without a real wall. About this suppurative focus, necrosis of the brain substance lining the irregular, non-encapsulated cavity, continues with formation of more pus. The cavity is lined with shaggy necrotic tabs of hemorrhagic brain tissue. Beyond the necrotic zone there is a layer of markedly edematous brain substance. The edema is marked and extends most rapidly in single metastatic lesions.

The suppurative process may extend, without being limited, into the meninges or ventricle, which may prove fatal. Should the protective reaction of the brain be sufficient, the suppurative process becomes limited, the edematous area is lessened, the accumulated pus is walled-off or "encapsulated" and a chronic brain abscess results—a most fortunate occurrence.

The wall of the abscess may have a thickness of from 1 mm. to ¼"

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or ½", the usual thickness observed being about 2 to 4 mm., requiring from three to five weeks in its formation. The wall may be so firm that the lesion could be mistaken for a solid tumor. In fact, instances are reported in which the entire abscess was removed as a tumor, and its true identity was not detected until sectioned.

The type of organism producing the abscess, and the amount of resistance offered by the brain substances, influence the formation of an abscess wall. In cases where certain anaerobic organisms are present, there is little tendency to walling-off. The wall may be quite firm, thick and resistant, due to the presence of a larger amount of fibrous tissue. On the contrary, some of the well-defined abscess walls, even though 2 to 4 mm. thick, are soft, friable and easily perforated or torn. All are not alike in this respect.

The wall is thickest at the pole of the abscess near the involved bone, external pole in temporal and frontal abscesses, and anterior or internal pole in most instances of cerebellar abscesses. The inner wall, the so-called "pyogenic membrane" is fairly smooth. The color of its inner surface is usually yellow or pinkish yellow. The outer wall usually has the dark brownish red color of a decaying cherry, or it may be gray.

In an early abscess that is not encapsulated, and before definite, firm encapsulation has taken place, the contents are not homogeneous. They consist of a supernatant yellow, oily, murky liquid and a residual thicker fluid made up of pus and brain debris or detritus. In chronic abscesses with a firm wall, the pus is usually thick and yellow or greenish-yellow. It may have no odor, or the pus may be very fetid and foul-smelling.

The shape of most abscesses is ovoid, with the smaller pole directed toward the infected bony cavity from which the infection spreads to form the abscess. Other abscesses, especially single, metastatic abscesses, are more likely to be spherical. In instances where the abscess has spontaneously evacuated itself through the cribiform plate or through the external auditory canal, the abscess may be the shape of a fig, surrounded by pericapsular purulent necrotic brain substance.

Abscesses most amenable to surgical treatment range from the sizes of a large malaga grape to that of an orange. The usual size is about that of a golf ball or a tangerine. The amount of pus contained varies from one or two teaspoonfuls to over seven ounces, the most observed by the author in which recovery took place. The average capacity is from one to three ounces in cerebral, and about one ounce or less in cerebellar.

Any of the pyogenic organisms may produce a brain abscess, the most common being Streptococcus haemolyticus. Some are due to the pneumococcus, the staphylococcus, colon bacillus, etc., or the organisms may be mixed. Some abscesses contain sterile pus. Anaerobic organisms probably play an important role, especially in metastatic abscesses.

### Source of Infection, and Location of Abscess

1. Otitic infections: mastoiditis, otitis media, necrosis of the petrous pyramid, thrombosis of the lateral sinus, etc.
2. Infections of the accessory nasal sinuses.
3. Metastatic.
4. Various diseases of the skull: osteomyelitis, malignancy, actinomycosis, etc.

Abscesses resulting from otitic infections are usually located in the homolateral temporal or cerebellar lobe, or both, the temporal region being more commonly involved. Involvement of the contralateral hemisphere may take place, in which the infection spreads through the sinuses. This is not common. The temporal portion of the temporosphenoidal lobe is involved more often than the sphenoidal. In the case of cerebellar abscesses, the outer inferior portion of the lobe is more frequently the site of the lesion, but it may be central in position.

An abscess secondary to infections of the nasal accessory sinuses usually involves the frontal lobe. It occupies, as a rule, the anterior pole of the lobe extending backward, upward and outward, external to and above the anterior horn of the lateral ventricle. However, it may be situated in the lower internal portion of the lobe nearer the falx and base than to the cranial vault. The homolateral lobe is usually the one involved but the abscess may be in the opposite lobe, and the lesion is sometimes bilateral.

Metastatic abscesses are single in about 50 per cent of the cases and may be amenable to surgical treatment, while 50 per cent are multiple and usually hopeless. Single abscesses are most common in the left cerebral hemisphere—fronto-parietal, frontal, parietal, or occipital, in order of frequency. The cerebellum is seldom involved. Single abscesses are usually large, originate in the white matter and encroach closely upon the lateral ventricle.

An abscess resulting from osteomyelitis may be single or multiple,

and is usually situated near or adjacent to the suppurative process in the bone.

Traumatic abscess may be situated in any part of the brain, especially when it is associated with a foreign body. The cerebral hemisphere, being more exposed to penetrating compound fractures of the skull, is more often the site of a traumatic abscess.

Let us now consider the individual abscesses—namely, temporal, frontal, cerebellar, traumatic and metastatic—with regard to their origin, symptoms and diagnosis.

### Temporal Lobe Abscess

Abscesses occur more frequently in the temporal lobe than in any other part of the brain. It is secondary, as a rule, to otitic infections and its presence may be recognized either before or after a mastoidectomy has been performed. A common picture is that of a patient who has had a chronic, purulent discharge from the ear for a long time, or, mastoidectomy has been performed and the patient is not doing well afterwards. The wound does not heal completely or as well as it should. There is a continuation of foul-smelling purulent discharge from the ear, or the discharge may have ceased rather suddenly. Cholesteatoma, with necrosis of the dural plate and pathological exposure of the dura, may be found. The cortex of the mastoid may be hard and eburnated like ivory, while the bony areas near the dura may be soft and partly destroyed by the disease. The abscess may have existed for some time and a mastoidectomy may not have been performed.

The infection spreads from the diseased area in the middle ear along the following pathways:

a. Necrosis and perforation of the roof of the tympanic cavity. An extradural abscess may be present. The dura and other meninges become adherent to the necrotic bone area and to the brain, and the infection spreads directly into the brain substance and an abscess forms. Most of these occur in patients between 20 and 40 years of age for the reason that the roof of the tympanic cavity is much thinner and more friable in adults than in children. The external portion of the wall of these abscesses is situated very near the surface, may have a "stalk" connecting it with the diseased area in the skull, and may even perforate the wall spontaneously and discharge large quantities of pus through the external auditory canal.

b. Infection may extend or spread along the perivascular spaces of perforating blood vessels. In such instances the abscess wall is at a greater distance (1-3 cm.) from the meninges covering the temporal cortex. There may be no gross changes in the cortex.

c. Purulent thrombosis of the lateral sinus may be followed by abscess formation in the temporal lobe, but it is more frequently the cause of a cerebellar than a temporal abscess.

d. The infection may pass through the internal auditory meatus but this seldom occurs. Petrositis involving the tip of the petrus is more likely to produce meningitis than brain abscess.

*Symptoms and signs of temporal lobe abscess:* Symptomatology and neurologic signs vary considerably with regard to the stage of the development of the abscess. Pain in the ear, later in the head, is one of the first symptoms. The pain is located in the temporal region but radiates to the frontal and less frequently to the occipital region. It is not called a "headache" by the patient, but "pain." The pain is severe and sometimes excruciating, so that the patient may cry and moan. In children the crying is hard and prolonged and not the sudden short outburst of crying observed in well developed meningitis. The pain may be intermittent or continuous. Seldom does one fail to obtain the history of pain if the patient or family is carefully questioned. The pain is due to the rapid increase of intracranial bulk resulting from the suppurative encephalitis accompanied by marked edema. Loss of appetite and vomiting, not usually associated with nausea, occur early. A mild or severe chill, or chilly sensation is experienced early in most cases lasting from a minute or two to a half hour.

The pulse and temperature are elevated at first, more in children than in adults. There is no choking of the discs or engorgement of the veins at this time. There is marked prostration; the tongue is coated, and there is a foul odor to the breath. During this time, in the first two or three days, the diagnosis of the true condition is seldom made, though it may be suspected. High fever, stiff neck, and the Kernig sign are present only when meningitis accompanies the formation of the abscess.

Should the suppurative area not be limited, the process usually extends into the ventricle, meninges, or both, and suppurative leptomeningitis ensues, followed by death. Should the process be limited, and circumscribed and a definite wall be established, the symptoms and signs change in character and degree. The pain is not so severe in many in-

stances, but may be marked in others. The patient may not complain so much of the pain on account of the general diminished sensibility, diminution of the encephalitis and edema, or both. It is believed to be due for the most part to the former, i.e. diminished sensibility, for there is still marked increase of intracranial pressure, and the hemisphere containing the abscess is always much larger than normal. The patient as a rule becomes lethargic, stares vacantly, and there is a loss of cerebration and attentiveness amounting to a dreamy state. One may gain the patient's attention by sharply spoken words or commands, but soon he lapses into an inattentive, listless condition. The temperature ranges from normal to 102° F. Although some observers state that the temperature is normal, or even subnormal, most of the patients whom I have observed have registered a rectal temperature of between 100 and 102° F. No one has satisfactorily explained why the low temperature exists. The pulse becomes slow, and may be as low as 45 or 50 per minute or less. It may be normal, but not increased, except in complicated cases. The respiration rate is also lowered, but is usually regular.

There is rapid loss of weight. (On recovery, the gain is likewise rapid.) The breath is very foul and the teeth are covered with dirty yellow material.

Paresis of the face on the contralateral side is to be expected, but it never reaches the degree of paralysis seen on the homolateral side due to the physiological or anatomical interruption of the facial nerve by disease or operation upon the mastoid. Only in large abscesses, or in those with extensive edema does one observe paresis of the arm of the opposite side, and rarely is the lower extremity involved. Sudden hemiplegia of the opposite side is never seen except in instances of suppurative leptomeningitis or metastatic lesions.

Aphasia in some form is usually present in lesions of the left temporal lobe in right-handed patients, and vice versa. The most frequent form is anomia—the use of the wrong word. The next most frequent type is circumlocution—the inability to name an object though able to state its use. Motor aphasia is seldom observed and when it is one may know that the abscess is large and extends farther forward than usual.

Ophthalmological examination usually gives interesting data. The pupil may be dilated as a result of pressure on the third nerve. Seldom is the nerve completely paralyzed, and then only if meningitis is present. There may be paralysis of the sixth nerve with inability to look out-

ward, the nerve involvement being due to highly increased intracranial pressure or to concomitant petrous tip involvement. The most constant finding is engorgement of the retinal veins, usually more marked on the homolateral side. Hemorrhages, fresh and old, may be seen, especially in abscesses which have existed for several weeks. Papilledema is not observed early but may be marked, 3-5 diopters, by the time the patient comes to operation. The amount of swelling of the discs does not determine the size of the abscess. If the patient is coöperative, quadrantic or hemanoptic defects may be determined. These are of value in localizing the lesion. Astereognosis is often demonstrated in coöperative patients.

The deep reflexes are usually increased, greater on the opposite side. The Babinski sign on the contralateral side may or may not be present. The abdominal reflexes are usually diminished on the opposite side.

Lumbar puncture often reveals clear fluid under pressure, well over 200 mm. of water. The cell count may be normal but is usually increased, 20, 50 or 100 or more per cm. Before encapsulation takes place the cells are predominantly polymorphonuclear cells. When the cells are predominantly lymphocytes, it is an indication that walling off of the abscess has been completed. Although rapid removal of a large quantity of cerebrospinal fluid may result in a fatality, it is not believed that the slow removal of about 2 cc. of fluid through a small needle for diagnosis is ever followed by untoward results. In fact, a careful lumbar puncture may at times be of therapeutic value.

The leukocytic and polymorphonuclear cell counts are increased as a rule, the former ranging between 11,000 and 18,000 with an average of about 14,000 cells per cm. and the latter from 85 to 92 per cent. Only in old chronic well walled-off abscesses is the count not increased. Radiographic films may be of some value, especially if a pathological exposure of dura has occurred.

You have heard the words "usual" and "likely" repeated. From this one can readily infer that all cases do not always present these signs and symptoms, especially when first seen by the neurologic surgeon. The patient may be in such profound stupor or coma that no history is obtainable from him, and very little definite information can be had from relatives or friends. On the other hand, the abscess may be so walled-off, benign and innocuous that no sign or symptom is present, and the fact that an abscess exists may not be determined except as an

incidental finding at autopsy. Such may be the extremes in signs and symptoms.

The abscess may become calcified and give no further trouble. The contents may become sterile, the lesion quiescent, and no trouble develop until the patient sustains a trauma, like a blow on the head. Then the abscess may increase in size and rupture spontaneously into the meninges or ventricle with fatal termination. One of these complications usually arises if the abscess is not successfully operated upon, but the patient may survive, ignorant of the presence of a brain lesion of any kind and die of other causes. The abscess may rupture spontaneously through the ear, but cure is not likely to be effected by so doing. Although death may result from greatly increased intracranial pressure which paralyzes the medullary centers, it is more likely to follow sudden rupture into the meninges or ventricle. In the former, death results in about 6 or 8 days, and in the latter, within 36 hours.

*Diagnosis:* One would be justified in concluding that a diagnosis should be made readily and easily after considering the points enumerated. In some instances this is so, and the diagnosis can be made almost as readily as in the ordinary cases of acute gangrenous appendicitis. This is not always the fact. At times diagnosis and localization of a brain abscess may be extremely difficult—sometimes even impossible.

Plain stereoscopic roentgenographic films should always be made. Air or gas may be present in the abscess cavity so that definite information may be obtained regarding the localization and size of the abscess. Shifting of the pineal body can be seen in certain cases.

Electroencephalograms are very valuable in the localization of cerebral abscesses. They are corroborative, with correct localization in about 72 per cent of cases. They are of doubtful value in cerebellar abscess.

When in doubt, one should resort to ventriculograms. Any case of temporal abscess which lends itself to operative interference will produce displacement and distortion of the lateral ventricles. Ventriculography is preferred to encephalography and is believed to be safer in these cases. Accurate localization of the abscess is most important if a successful outcome is to be expected. Indiscriminate exploratory punctures with a cannula, or exploratory punctures through an infected field can be mentioned only to be strongly condemned.

Temporal abscess should be differentiated from middle ear disease with adjacent edema of the brain, "serous meningitis," extradural ab-

scess, sinus thrombosis, brain tumor, spontaneous subcortical hematoma, chronic subdural hematoma, and abscesses in other portions of the brain.

### Frontal Lobe Abscess

An abscess in the frontal lobe gives rise to the same general symptoms and signs as a well developed abscess in any other part of the cerebrum, namely pain in the head, nausea and vomiting, foul breath, prostration, rapid loss of weight, slight elevation of temperature, slow pulse, fundi changes, leukocytosis, findings in the cerebrospinal fluid, changes in reflexes, slow cerebration, drowsiness, stupor and coma.

Localization and lateralization are usually much more difficult than in any other abscess. In fact, the neurologic findings may be very meager, almost to the point of being non-existent. When the general symptoms and signs of a brain abscess are present in a given case, the mere lack of localizing signs would make one choose the frontal lobe as the probable site. This is true especially if the abscess is small or has reached a very chronic stage. The abscess may be very large, almost unbelievably so, and it is only when the abscess or the surrounding edema is extensive that lateralization may be determined. As the abscess or surrounding edema progresses backward, the two most helpful findings present are aphasia, when the "dominant" lobe is involved, and paresis which the lesion produces. Paresis of the opposite upper extremity (weakened grip, etc.) occurs first, followed by that of the lower extremity, and last, if at all, of the face. In temporal abscess, the paresis is noticed first in the face, then arm, and last, if at all, in the lower extremity. Flaccid hemiplegia has never been observed except when the abscess has ruptured into the meninges. Rupture into the ventricle will otherwise occur before the abscess produces complete hemiplegia.

Dilatation of the homolateral pupil and unilateral loss of smell are of value in determining which lobe is involved. X-ray films of the sinuses and the operative site may suggest the side involved, although the abscess may develop in the frontal pole opposite to the operative site, or it may be bilateral. Frequently there is tenderness on percussion.

In an instance where one has very definite reasons for believing that an abscess is situated in a frontal lobe, exploratory puncture is advisable. If negative, ventricular puncture for ventriculography can be made through the burr hole. Where signs and symptoms are not of lateralizing value, ventriculography is preferred. The ventriculograms will show

marked compression and displacement of the ventricle backward and downward.

### Cerebellar Abscess

Cerebellar abscess is more frequently found in children and younger people than in adults. The abscess is usually located in the lobe adjacent to the involved mastoid or lateral sinus or both, is more frequently situated in the external portion of the lobe, and is smaller than the usual cerebral abscess. Frequently it is the shape of a bird's egg, with the smaller pole directed forward and firmly fixed to the posterior surface of the petrus, from whence the infection extends. However, it may be centrally located within the cerebellar lobe.

From the foregoing one can readily understand what the signs and symptoms might be. As the abscess increases the size and shape of the lobe which it occupies, pressure is made across the midline, resulting in displacement of the medulla and brain stem, producing, as a rule, homolateral pyramidal tract signs, compression, and blocking of the aqueduct, causing internal hydrocephalus. This results in marked increase of intracranial pressure, bilateral papilledema, which may be equal, and bilateral frontal headache. Tenderness and pain on percussion may be elicited over that portion of the occipital region beneath which the abscess lies. There is frequently associated soreness and slight stiffness of the neck, more on the involved side than on the opposite. Nystagmus toward the affected side is usually observed.

Diagnostic lumbar puncture must be done with great care. Therapeutic lumbar punctures are banned. For relief of pain, ventricular puncture through a burr hole over the homolateral anterior horn is easily accomplished and should be done in every case. In most cases of cerebellar abscess observed by the author the patients were stuporous or in coma. Following ventricular puncture the mental condition clears up almost immediately and the severe pains are relieved. During this procedure air can be readily substituted for the cerebrospinal fluid and ventriculograms should be made. These will show the degree of the dilatation of the ventricles. On the antero-posterior film the lateral ventricles will show moderate symmetrical dilatation, and the third ventricle will appear dilated and in the mid line. On the postero-anterior view the posterior horn on the involved side will be smaller than that of the opposite side. This is due to the pressure exerted from below up-

ward by the increased size of the involved cerebellar lobe, the pressure being transmitted despite the intervening tentorium. In labyrinthitis this does not hold true; therefore, ventriculograms are valuable in differentiating between these two conditions. Aqueduct obstruction will also be demonstrated.

### Traumatic Brain Abscess

Traumatic brain abscess may follow various kinds of trauma such as punctured wounds of the skull and brain, compound fractures of the skull and gunshot wounds. The abscess may develop rapidly and show definite evidence of its presence in two or three weeks. It may form many weeks, months or years after the original injury. In a small punctured wound of the skull, dura and brain, the infection is carried directly into the brain, and the production of an abscess is due to direct implantation. This process may likewise follow extensive compound fractures of the cranial vault, but if the original wound is properly treated, and sulfanilamide is used, the subsequent formation of a brain abscess should be rare. Compound fractures of the base of the skull are much more likely to produce meningitis than abscess.

In some cases the original wound may have been sutured and well healed externally, only to be followed several weeks later by signs and symptoms indicating development of an abscess. Simple depressed fractures sometimes involve the mastoid and the frontal sinus and ethmoids in the fracture lines, allow release or spread of pre-existing infection from these structures into the fracture lines, and thus open pathways to the brain followed by abscess formation.

Associated with partial avulsion of the scalp, infectious material may be ground into the outer table of the skull, local necrosis of the skull may occur, giving rise to an abscess of the brain comparable to one complicating osteomyelitis of the skull.

An abscess may develop spontaneously from latent infection about a retained foreign body in the brain many years after its introduction, or shortly after removal of a foreign body which was retained for many years. In a case observed, a large abscess developed at the site from which a piece of knife blade was removed. The piece of knife blade measuring 3½ inches in length with a saw-tooth edge, had been in the brain for over 28 years, the longest noted interval in the experience of the author.

Abscesses may appear early or late in bullet tracks, with or without retention of foreign bodies. When the abscess is secondary to a punctured wound of the brain, compound comminuted fracture with or without dural laceration, simple depressed fractures of the skull involving the mastoid or nasal accessory sinuses, its location is usually beneath and near the site of injury. Pus may be seen discharging through the wound, or there may be no discharge of pus. There is always a considerable amount of fibrous tissue formation in the structures overlying the abscess and the communication may be well walled-off. For these reasons, this type of traumatic abscess is especially amenable to operative interference. Another important bearing on the probable prognosis is that the abscess is single in about 90 per cent of the cases. Abscesses about deeply retained foreign bodies offer many more difficulties. Traumatic abscesses which do not communicate with the wound, and therefore do not discharge pus, present general symptoms and signs observed in cases of any well formed abscess of the brain. Should pus be discharging from the wound, symptoms and signs will usually be of a lesser degree on account of the continuous decompressive effect.

### Metastatic Brain Abscess

About 50 per cent of these cases are multiple, and therefore in most instances are hopeless. In cases of a single abscess, the surrounding edema and softening of the brain is more extensive than that present in any other form of brain abscess. It is always in the white matter. For these reasons earlier rupture into the ventricle, and not into the meninges, occurs. A fatal result ensues within two or three weeks in the majority of cases. On the other hand, encapsulation may occur, but all of these abscesses are large and encroach closely upon the ventricle. The intervening wall may be so thin that it appears translucent after evacuation and inspection of the abscess cavity, and there is grave danger of ventricular rupture from the ventricle into the abscess cavity if the postoperative increase of intraventricular pressure is not controlled by lumbar punctures.

Since the abscesses are usually in the fronto-parietal, parietal, or occipito-parietal regions, localizing signs and symptoms such as hemiplegia, hemianesthesia, homonymous hemianopia and aphasia, are frequently present and localization is readily made. Operation is performed on the sixth or seventh day.

*Prognosis* is good in all cases of single uncomplicated, well walled-off abscesses. This opinion is not universal, and previous to the last two decades, recovery was not expected by physicians or laymen. When a patient recovered, luck was thought to have played a big part. Sir William Macewen of Glasgow in his outstanding book "Pyogenic Diseases of the Brain and Spinal Cord" published in October 1893, held a different view and even then stated in one of the concluding paragraphs: "One might almost conclude that in uncomplicated abscess of the brain, operated on at a fairly early period, recovery ought to be the rule."

*Treatment:* All of the extradural foci should be eradicated. Operations upon the mastoid and sinuses, without the use of mallet and gouge, should have been completed. Many "brain abscess pictures" will clear up, due to the fact that the condition was caused by edema, extradural abscess, etc. At present the treatment of the abscess is surgical. This statement does not imply that the operation has to be done immediately in all cases. With the exception of cases of single acute metastatic abscess, it is best that the operation be done after the third or fourth week, at which time complete walling-off and encapsulation of the abscess is expected. The increase in the cerebrospinal fluid cell count, changing of the nature of the majority of cells from neutrophils to lymphocytes, is indicative of better encapsulation. Should operative interference be advisable, supportive dehydrating measures should be adopted. Blood transfusions may be indicated. Intravenous administration of 100 cc. of 50 per cent solution of sucrose is probably the best dehydrating agent. Its dehydrating effect is more prolonged than that of glucose; its results are striking in some cases of abscesses. It has been observed that a change from deep coma to that of clear mentality has followed administration of sucrose or glucose and the reverse was true when the solution was withheld.

When the proper time for operation on a cerebral abscess has been determined, the open method is preferred to the closed method of tube drains or tapping. With the open operation, advocated by the author in 1923 and used by him since that time, the overlying bone, dura and cortex are removed, the bony opening measuring about 2 to 3 cm. in diameter. Most abscesses amenable to surgery are situated not more than 2 cm., and frequently much less, from the dura. This has been observed many times at operation and in museums. Through a dural opening of the size suggested, after removal of the presenting portion of

the abscesses wall, the cavity is readily evacuated and inspected. Secondary pockets or extensions may thus be detected and dealt with. These pockets could not conceivably be drained by tubes through a small drain, as is used in the closed method. Slow controlled elevation of the floor of the abscess to the level of the skull accomplishes extinction of the abscess cavity, prevention of secondary pockets, rupture into the ventricle, and meningitis. Sulfanilamide and sulfathiazole gauze is used in the cavity. The entire area is healed in from 35 to 60 days. A scalp plastic with excision of the scar is done after six months. Cranioplasty—closure of the cranial defect with a tibial graft—has been done when a frontal defect requires it for cosmetic and protective purposes.

I wish to call your attention to the following observations regarding the use of a drainage tube in cerebral abscesses. In six cases in which colleagues have used a tube to drain the abscess, I have oberved that a considerable amount of pus had drained out through the tube and the patient would improve for 4 or 5 days. Then the surgeon would notice that the patient was "not doing so well." When I was called to see the patient and removed the dressing, the end of the tube could be seen sticking up above the wound, in some instances with slight herniation of the brain and not a bit of pus exuding through the tube. Nevertheless, the patient would be quite ill. I would then be asked to take over.

With the patient placed on the side and the drainage tube directed upward, but still in place, a lumbar puncture was performed and cerebrospinal fluid was allowed to escape. Each time, after removal of about 10 cc. of cerebrospinal fluid, pus began to ooze out through the wound, both through and alongside the tube. As more fluid was allowed to escape, more pus exuded from the wound. The amount of fluid allowed to escape ranged between 35 and 45 cc. By the time this amount of fluid had been removed, an enormous outpouring of pus took place. After the opening in the bone was enlarged with rongeurs, and that in the dura and the brain cortex by means of electrocoagulation, the tube was removed and exploration of the tract was carried out under direct vision. One could then observe that the abscess cavity was partially collapsed about the tube, leaving three pockets, placed at thirds (or about 120 degrees) in the circumference of the abscess cavity, so that a cross-section of the cavity would somewhat resemble a three-leaf clover. These pockets were caused by compression of the brain abscess cavity against the tube from three directions, infolding the wall of the cavity

in such a manner that three pockets of pus were isolated from the tube and from each other. The appearance of the bulging portions of the abscess wall against the tube was not unlike that of the tricuspid valves viewed from the cardiac side. The valve corresponded to the bulging portion of the cavity wall, and the space between the valves corresponded to the small collapsed space leading to each pocket. The pus could not escape through the tube but remained and increased in amount in each pocket. Therefore, one could understand why the patient's condition became worse four or five days after initial drainage of the abscess with a tube had temporarily improved the patient's condition.

After 35 or 45 cc. (varied in the six cases) had been removed, the lumbar puncture needle was removed. Sufficient amount of decompression of the ventricles had been accomplished, the abscess cavity again became wide open so that only one cavity was present, and the pockets disappeared. Cross section of the cavity then would have shown it circular instead of the shape of a clover leaf. After removal of all remaining pus, the cavity was completely inspected and found to be similar in all respect to a "normal" brain abscess cavity. The cavity was then treated in the manner described–iodoform gauze, dakinization, etc.–and all six patients made uneventful recoveries.

The above described phenomenon is offered for the benefit of those who use tube drains through a small opening in the skull. The condition found might have occurred in cases treated by surgeons in this manner and been the cause of death in a number of cases ascribed by them to bad operative technique.

Drainage tubes are used *only* in cerebellar abscesses where there is no ventricle to be considered; where, in the majority of cases, the anterior pole of the abscess is fixed to the infected petrus by adhesions which should not be separated and where prolonged drainage of this area is proper. Furthermore, no elevation or herniation of the floor of the abscess should be permitted on account of shifting or torsion of the brain stem and medulla. Preliminary ventricular puncture should always be done, pre- and postoperatively if necessary.

## Results

Seventy-nine cases of brain abscess of all types, including those of metastatic origin, have been observed since 1920, and a number of traumatic abscesses and brain fistulae were observed during the four and

one-half year service with the German and American armies in World War I. A number of these abscesses had been previously operated upon or tampered with before coming under the observation of the author.

Forty-two of these patients survived, and thirty-seven died. Of the recoveries, eight were frontal, fifteen were temporal, nine were cerebellar, six were traumatic and four were metastatic. Two cases recovered after gross rupture into the ventricle, with associated meningitis, coma, and loss of sphincter control. They are now well. Four of the patients who recovered have died subsequently; one frontal a few months later of an unknown cause, and the others several years later. One frontal died of nephritis, and one in a drunken stupor with negative autopsy findings with regard to the operation. One cerebellar died of recurrence of the abscess, or formation of another abscess near the same site on account of an incomplete operation on the mastoid. The remaining thirty-eight are well so far as the abscess is concerned, and are either in school or at their usual occupations with two exceptions. Both of these were traumatic abscesses which resulted from self-inflicted wounds with suicidal intent in demented patients, both of whom are in institutions. The four metastatic abscess cases have some residual weakness of the operative side, in all of whom complete flaccid hemiplegia had existed. These four are otherwise well. The first survivor was operated upon 22 years ago, and the last, a traumatic abscess, was operated upon ten months ago.

Of the thirty-seven deaths, eight were frontal, ten were temporal, four were cerebellar, and fifteen were metastatic (3 single and 12 multiple). None were traumatic. In three of the early cases in 1920 and 1921, tube drains were used before the open method was introduced. In one frontal lobe abscess, the tube became displaced and in an attempt by an assistant to replace it, the drainage tube was placed into the brain substance outside the drainage tract; in one frontal, the tube perforated the ventricle; and in one temporal, the tube was removed too early and a secondary pocket ruptured into the ventricle. Eleven were multiple, metastatic, in both hemispheres and were, therefore, hopeless; three were large, single, metastatic abscesses in which the dilated ventricle ruptured into the evacuated abscess cavity through the thin intervening wall before the introduction of lumbar puncture to reduce intraventricular pressure. Two were acute abscesses, 1 with blood stream infection of staphylococcus aureus, while 1 patient was moribund and was

tapped only to satisfy the family. Six cases were complicated by suppurative leptomeningitis at time of operation, 1 bilateral frontal.

Four were cerebellar; one patient died following mastoidectomy, not operated upon for abscess but aspirated after death; one was moribund when seen, due to jamming of the conus in the foramen after repeated lumbar punctures by one of kind intent but poor judgment, and autopsy revealed rupture of the abscess against the pons; one early case in which the wire cone drain was used, and one patient in whom the abscess was not drained. One patient with frontal lobe abscess recovered from the original abscess and died later from a secondary abscess formed from reinfection, or lighting-up of the infection in an improperly operated frontal sinus. Ventriculograms would have located this abscess.

Four patients were operated upon according to the method advised and should have recovered, but died as a result of mishaps or accidents: 1 temporal, in a six year old girl who died of pneumonia following dakinization and being placed by an open window in the winter time; 1 temporal, in a distant hospital, removed the dressing and tore the brain substance by clawing with her fingers; 1 temporal, well walled-off, in a comatose woman who at the time of operation had a temperature of 104° F. and insufflation pneumonia, due to pouring eggnog down her trachea by a kind young nurse (at autopsy, egg and milk were found in the lungs); and 1 temporal in an unmanageable coastguardsman, who got out of bed on the sixth postoperative day, and the abscess ruptured into the ventricle.

Forty-four patients were operated upon according to the methods described, and followed by the management of the case as is now done. Of this number, forty survived and four died. Of the four deaths, two were due to preventable pneumonia, one to removal of dressing in a distant hospital, and tearing of the brain, and one to rupture of the abscess into the ventricle in a patient who was not controlled, and who got out of bed on the sixth day. Several of the earliest cases should have recovered had we but known the proper technique and management. The remainder were hopeless from the time of the first examination, some were moribund, and two were dead when first seen.

In all of the cases which recovered, only one operation was required for the cure of the abscess with but one exception. This case was one of multiple metastatic abscesses of the left cerebral hemisphere, secondary to an infected bone graft incision of the spine, in which case

nine separate abscesses were drained by a former assistant, Dr. Frank Turney. No patient has had postoperative convulsions except four, and these had convulsions before the operation. As experience with these cases has increased and early observation of the brain abscess suspect has been made, the results have improved.

The incidence of brain abscess and osteomyelitis of the skull, like mastoiditis, has been markedly reduced since the introduction of the sulfa drugs. In view of the fact that the vast majority of the brain abscesses observed in the past were secondary to otitic and rhinogenic infections, infected scalp and skull wounds and, in metastatic abscesses, pleuro-pulmonary conditions, it is possible that our work in these conditions will become almost extinct. It is possible that the sulfa drugs may sterilize the purulent contents of the abscess cavity, dissipate the surrounding edema and render the brain abscess innocuous, so that it may remain in situ without doing harm, or be easily extirpated in toto, like a tumor.

# ON A BRAIN LESION CONSTANTLY FOUND IN HEAD INJURIES*

José Arce

Professor of Surgery, Emeritus
University of Buenos Aires, Argentina

When Dr. Ashford kindly extended me the invitation—for which I wish to thank him—to participate in the Graduate Fortnight on the Disorders of the Nervous System, I was all but compelled to decline. I am far from my usual place of work and, lacking all of my clinical records here, it would not be easy for me to prepare an address worthy of the Academy, which is our host, and of the distinguished audience that has met here tonight. But I could not fail to take into account the honor which such an invitation implied, coupled with the fact that I have but recently been made a Fellow of the Academy, and so I felt it was my duty to accept. This, then, is the reason why instead of hearing the words of Dr. William Cone, who was originally to be the first speaker on tonight's program, you will have to listen to me.

I take this opportunity to thank all Fellows of the Academy, and all individuals who have been instrumental in having my name added to the roster of my eminent colleagues of this Society, for the honor thus conferred upon me.

In accord with the program of this Fortnight, I have selected for my brief lecture a subject that follows the line of the topics to be considered in the present series of lectures.

This occasion also affords me an opportunity to render homage, once more, to the memory of my disciple and friend, Dr. Manuel Balado, whom death has recently torn from our midst when nothing led us to suspect that we might lose him, so full of youth and at the height of productiveness.

Together with him, a few years ago, we made some studies on the lesions observed in the brain consequent to violent traumas causing immediate or early death of the victim.

It is in these cases that can be studied the initial lesions caused by

* Read October 13, 1942 in the fifteenth Graduate Fortnight of The New York Academy of Medicine.

trauma, before they are transformed, changed or obliterated by reason of their evolution, as does or may occur when the patient survives a few days or is cured.

However, by their very nature, these accidents fall within the purview of the police and the judiciary, and consequently, common though they be, they are but rarely available for study by workers who are exclusively interested in the scientific aspects of the case. Most often, such workers have no chance to study medico-legal autopsy material until some time has elapsed, long enough to allow the anatomical condition of the tissues affected by trauma, to be profoundly modified.

We were fortunate, by special arrangements with the authorities in charge of handling such cases, to receive autopsy material, fresh and in perfect condition, sometimes no more than one hour or two after the death of the victim. This valuable material was immediately fixed in formol, and studied with minute care.

The histological specimens showed hemorrhages varying in size from punctate to hematomas, the size of hazelnuts, and more or less confluent; but then they also revealed the presence of fluid separating the cells and nerve fibers, and saturating, as it were, the nerve substance. It was as if a large quantity of plasma had extravasated. This true acute cerebral edema, we believed, caused compression more severe than that produced by the extravasated blood, for the simple reason that it affected the entire brain, both close to and away from the hemorrhagic areas.

Study of numerous preparations from different parts of the brain and many different accident cases demonstrated to our satisfaction that this acute cerebral edema was the real cause of acute cranial hypertension, and of such intensity as to be able, alone, to cause death of the patient.

This observation explains certain findings which seem paradoxical at first sight: patients brought in with skull fractures and visible injuries, presenting a very serious picture, do survive, while others, with neither fracture nor visible injuries, die either directly in the accident or shortly afterwards.

However that may be, and I do not propose to examine the pathological aspects of these cases, one fact emerges conclusively established. It is the constant presence, from the first, of severe cerebral edema in head injuries, independent of the subsequent evolution of the lesion.

For the reasons here shown we are as a rule averse to operating on

patients with head injuries. That is, unless local lesions present special and urgent indications for an emergency operation, we prefer treatment by absolute rest and prompt removal of the hypertension.

And how is that to be accomplished, you may ask. This is the way: Every eight hours, 20, 25, and 30 cc. hypertonic saline solution, let us say, of 20 per cent concentration, are given intravenously. This hypertonic saline draws the extravasated fluid into the circulation, drains the entire brain, produces decompression, and in this manner effectively controls hypertension.

The treatment may be combined with the classical treatment directed to decongestion: purgatives or drastic enema, or both at the same time, depending on the case in hand.

For the first we are not interested in finding out whether fracture has occurred, because roentgenography requires moving of the patient. Nor do we seek to establish whether the cerebrospinal fluid contains blood; accordingly we forego lumbar puncture except in cases where the symptoms do not yield promptly to intravenous injection of hypertonic saline.

Our results from the systematic application of this method have been good. On this account we hold that treatment in similar cases should consist of absolute rest and cerebral draining by the technique I have outlined to you.

This, in sum, is the anatomical fact which I wanted to bring to your attention, especially because it furnishes the basis for an efficacious treatment available to every physician, when aid of a specialist cannot be secured.

At the outset of this brief address, I felt impelled to recall to you the memory of the man who was the first teacher of neurosurgery in Argentina, my pupil and dear friend, Dr. Balado. Permit me to add a few words. It was he who originated and taught the world the technique of ventriculography with iodized oil as radiopaque medium, which enables us to appreciate lesions which are difficult to discern by means of ventriculography, using air. And to him we also owe detailed studies of the optic paths in their relations to the geniculate bodies and the calcarine fissure, as also of the disorders caused by chronic meningitis localized about the chiasma. In recent years he devoted concentrated study to the electrical currents which can be registered in the cerebral cortex. His life was dedicated to study, observation and the progress

of neurosurgery.

If I have paid tribute to his memory in your presence, it was also with the purpose of showing to the young generation and those who disbelieve in the virtue of work dedicated to the furtherance of science, how much can be achieved, even in the regions of the human organism most difficult of access—if there is the will to contribute a something for the benefit of all mankind.

Sadly we must recognize that peace, justice and freedom are not always with us. Yet these are the three conditions essential to elevating the level of civilization, threatened as it is today by those who want to confound us by boasts that they are our betters because they have the brute strength to attain the objects of their ambitions. But for all that, we must continue to apply ourselves to our work, for ultimately science and civilization will prevail.

# LIBRARY NOTES

## *THE JOANNA STEPHENS MEDICINES FOR THE STONE**

### *A Faith That Failed*

EDWARD L. KEYES

"There are Many cured of Diseases by the Imagination only; for Nature often submits to the Thoughts and vehement Desires of the Soul and, our Spirits being affected, the Body is affected also."

(Words taken from a *Treatise on the Stone and Gravel*, by John Greenfield, published in 1710; in which year, let us assume, Joanna Stephens may have been born.)

It is an equal honor, gentlemen, you have done Medicine and myself, inviting us to appear before you. For myself, let me thank you truly but briefly, for I can not be sure that my gratitude is a major interest of yours. And I have scarcely the right to stand before you in the name of medicine since *Anno Domini*, the malady no one escapes, has stricken my name from the register of physicians.

It would, indeed, be more appropriate if I spoke this evening only of that mighty and merciful man to whom we owe my presence here. Throughout my life I have watched with awe the lustiness of Sam's laughter. Like his language it was free and gay beyond anyone else's on the south side of thirty-fifth street in the block where the Swedenborgian church stood, between Park and Lexington. I know, for I lived on the north side of thirty-fourth street and, on summer evenings, the yards between would echo with a hearty roar to which his brothers could retort only with lesser bellowings. . . . I have watched him grow more purple than the rest of us and then falter, as I begin to do, but all with a Johnsonian magnificence and gusto such as, perhaps, you will not see again in these rooms he loved so well.

He was happy here and I, who know how devoted a bibliophile he was, share with you the secret that laughter and ready expletive were part of his ebullient way of denying credit to himself. He was or, may I say, he is of that happy company who have learned how to curb to the service of humanity a seemingly boundless masculine vigor. The most characteristic yarn about him—pardon me the pleasure of repeating it—tells how a patient in the Presbyterian Hospital begged that Dr. Lambert might come to her room and, when he came, said, "Doctor, I had to see you. For days I have been listening to you swearing so beautifully at the woman in the next room that I just had to have you in to swear at me a little. I do so need to be cheered up."

With none of the self-consciousness of Tennyson's Sir Galahad, Sam's strength was as

* Read April 16, 1942, by invitation of the Grolier Club through the late Dr. Samuel W. Lambert, at the opening of its "Exhibition of Books on Healing by Faith, Fraud and Superstition in the Eighteenth and Nineteenth Centuries," arranged by Gertrude L. Annan, in charge of the Rare Book and History Rooms in the Library of the Academy. The list of books shown appears in the *Bulletin of the Medical Library Association* for October 1942.

the strength of ten because, for all the flotsam of youth that still found harbor in his talk, his heart was pure gold.

Restless spirit, may you roam eternity as gay and vivid as we knew you here.

But we must on with our business, gentlemen. The documents amid which you sit are medical in a sense, yes, but psychologically they are the history of resurgent error, of the hope deferred that maketh not the heart sick. They exhibit humanity in pursuit of the goddess, Panacea. Throughout history the relation of physician to patient has been a priestly one almost exclusively until, slowly and painfully and against the united opposition of the senior licentiates of each succeeding generation, man's skepticism as to his own infallibility forced itself to the fore and the human race began to grow up.

We still have growing pains. Today you will still find plenty of men ready to cast the first stone at the scientific method, failing to recognize it for what it is, our only measure of precise reasoning. We are far from being adult collectively, however ageing individually.

Meanwhile, struggling for room to live in a slightly imperfect world, we need Courage and Faith; Courage to carry on and Faith when Courage fails. Integrity we need as well, I grant, and Charity, the greatest of all, and some would say Hope, though you might dispute this; the martyrs to duty show an effective Faith, child of Habit and Hopelessness. One needs hope only to get set in one's habits; we drop our hopes one by one in the journey through life and camouflage our loss even to ourselves.

So here around you are the banners of faiths outworn, the texts printed on them rallying cries to forgotten panaceas. Laugh at them gaily as you will but, in the present state of our ignorance, do not forget how human they are. The heroes of medicine had their panaceas, too.

* * *

Tonight let me chat with you about a panacea, a lesser one, the distinction of which is that it swept the civilized world for a moment, won a grant from the British government, and initiated a series of cures for the stone that held a place in English pharmacy for a century or so.

When I was a medical student my father used to regale me with yarns of other days in medicine. One of them I never forgot. It concerned Joanna Stephens and the purchase by parliament of her secret remedy for the stone.

When I came to look up Joanna Stephens, for the purpose of writing this paper, I found her rather a dim figure but the persons who backed her were notables. Two of them, Hartley and Hales, still linger in the Britannica and have monuments in Westminster. They were wrong, these men of the XVIII Century, but since there was no cure for their stone save an operation more crude than infallible, their wrongheadedness must often have brought them greater happiness than right thinking could have done. 'Tis folly, sometimes, to be wise.

The year was 1737. The Old Style calendar was going out of use in England and the fashion of beginning your nouns with a capital letter about to disappear. George II was by the grace of God king and Robert Walpole, by the grace of Queen Caroline, prime minister. Across the channel Louis XV was beginning his long reign and beyond the ocean Benjamin Franklin, from whom we shall hear, was entering his thirties. John Wesley was "riding the roads of England."

To comprehend the situation you must know, as the contemporaneous world did not, that a stone in the bladder, as it grows larger, may excite less and less pain. If a fellow happens to have no great pain at the outset, his stone may later bother him so little that he forgets he ever had a pang. This is not always kept in mind by the doctors of today, as witness their surprise at the report of a number of such cases of "silent stone," as they are called, before the French Urological Society in 1918. The patients were seemingly healthy footsoldiers without a pain in the world who, after three years in the trenches, were delighted to learn that a cloudy urine might qualify them for a stay in hospital. A

number of these would-be malingerers were found to have huge bladder stones.

So: Joanna Stephens is introduced to us by David Hartley, A.M., F.R.S. Hartley is known to fame as the founder of the English school of Association Psychology. Such was the impression he made on his generation that forty years after his death Samuel Taylor Coleridge named his first-born son Hartley. His great work, "Observations on Man," though not published until 1747, was being written when he fell under the influence of Joanna. This was in 1737. Up to 1742 Hartley practiced medicine (though never an M.D.) in London, and thereafter in Bath. When he met Joanna he was 32 years old. A few of his prefatory remarks about her will give you a notion of his candor.

"It is now more than a Year that I have had the usual Symptoms of the Stone in the Bladder, with some Suspicion of that in the Kidneys. This made me listen to the Accounts of Mrs. Stephens's Medicines and, upon inquiring into some Cases, I was encouraged to try them. I have since been much more particular in my Inquiries and here offer ten Cases to the Publick, with an Abstract of some Experiments taken from a Journal which I kept of them. . . . As to myself, I am neither an Evidence against the Medicines nor for them, excepting that since the Use of them I have voided several angular Bits of Stone in so soft a State as to crumble easily. . . . My design in printing these Cases and Experiments is to engage the Publick to purchase the Discovery of these Medicines of Mrs. Stephens. She offers this at Five Thousand Pounds and is ready to submit the Effects of the Medicines which she discovers to any Examination which Gentlemen of Worth and Skill shall propose. It is easy to see how much concerned I am to know what these Medicines are which I take daily. But the Benefit which many Persons have plainly received from them in painful and dangerous Cases and my Opinion of their Efficacy in dissolving Stones of the Kidney and Bladder would render me inexcusable, if I did not use my best Endeavours to make them of general Service."

The first case cited is that of the Reverend, the Bishop of Bath and Wells. Let us spare his blushes.

Hartley tells us that Joanna "is the Daughter of a Gentleman of good Estate and Family in Berkshire. About twenty Years ago she accidentally met a Receipt for the Stone, consisting of Egg-shells dried in an Oven and powdered"—Lime salts for the treatment of stone are first mentioned by Pliny—"but finding it caused great Costiveness, she added a small Quantity of Soap"—and here spoke her genius—"to each Dose, with a view both to prevent this Inconvenience and to forward the Dissolution of the Stone. . . . About twelve Years ago she gave her Powder to one Mr. Coxon, adding thereto very frequently half an Ounce of Soap Decoction. He had Symptoms of the Stone in the Bladder, voided many Scales during the Use of the Medicines, and received a more remarkable Cure than any Person before him had done. Upon this she gave the Powder and Soap in still larger Doses and found them attended with proportionately greater Success."

"In the Year 1735 the Hon. Edward Carteret, Esq, Postmaster General, began taking Mrs. Stephens's Medicines and received great Benefit from them. This engaged the Attention of the Publick and more particularly such as were afflicted with the Gravel or the Stone, so the Number of People who took them increased every Day. In the Year 1737 the Cures performed by these Medicines were so many and so well attested that the speedy Publication of them was judged to be of great Importance to Mankind."

Two years after his first publication Hartley was again in print with "A View of the Present Evidence for and against Mrs. Stephens's Medicines as a Solvent for the Stone." This little essay, like its predecessor, seems a masterpiece of candor combined with complete subjection to the prevailing winds of doctrine. The experiments were soundly conceived to compare the solvent effects on bladder stones of (1) water, (2) water containing the medicines, (3) normal urine, and (4) Hartley's urine while he was taking the medicines. The last was far the most effective solvent, a result we should attribute to its alkalinity and bacterial content, factors one could not suspect in 1737. Moreover, the experiments were confirmed and expanded the following year by Morand in Paris and by

the Rev. Stephen Hales, F.R.S., who is remembered as the first experimenter on the phenomena of the blood pressure and who was a botanist of note. (Yet it is for his experiments on the Stone that he got his F.R.S.)

Were there a recording angel for science, these documents would be blotted with his tears, so earnest are they in effort, so searching in method (considering the then state of knowledge), so human in error. The supporting cases, though, are happy for most of them show great improvement during treatment—this treatment now so dead and always so disgusting! Drinking three pints of soapsuds a day, no wonder some of the victims revolted! Yet among the 152 patients whose cases are reported by Hartley, the 124 who seem to have had stone were, about two-fifths of them wholly relieved, two-fifths of them improved, and only one-fifth of them unrelieved or unable to stomach the medicines.

In those days they took it for granted that one got hard usage from one's physician. For example, twenty grains of calomel with as much jalap was the standard cathartic until Hahnemann earned the gratitude of mankind, not by his homeopathy but by his practice which spared man such unwholesome and unnecessary cruelties of physic. Even after Hahnemann, the impotence of physic was such that at Bellevue Hospital, in its early days, the wards were allotted a pint of whiskey a day per patient.

But I stray from my Joanna. Subscriptions were solicited toward the desired £5,000 and when these fell short, the list of subscribers was published, headed by the names of two bishops, an earl, the Rev. Stephen Hales, and Lady Betty Germaine, and ending with two physicians and the Duke of Kent. There were 187 names, down for £1,400.

But Joanna held out for her five thousand and since, following publication, subscription was not stimulated, parliament was petitioned in her name and, a year later, an act was passed providing "a Reward for Joanna Stephens, Spinster, upon proper Discovery made by her for the Use of the Publick of the Medicines made by her for the Cure of the Stone."

The committee of thirty appointed to pass upon the efficacy of the treatment included three archbishops, the Lord Chancellor, the Chairman of the House, six physicians and three surgeons, among them the leading stonecutters of the day, natural antagonists to the method.

The committee met the day it was appointed. Before them appeared four persons to testify that, having suffered the symptoms of the stone, their bladders had been searched by several qualified persons and the stone touched. Then they had taken the Stephens medicines for a number of months, had been relieved of their symptoms after passing (in all but one instance) fragments of stone and, thereafter, had been searched and no stone found. Twice the preliminary attestation as to the presence of stone and, for the lot of them, the final attestation that stone was no longer present, had been made by members of the committee. Stronger evidence of cure, personal and professional, could not be had.

You who complain of your hospital fees will be interested to know that the final examination of two of the witnesses was made at Child's coffeehouse in St. Paul's churchyard.

Thereupon the committee, having received from Joanna a description of the drugs and their manufacture and use, certified that "we have examined the said Medicines and are convinced by experiment of the Utility, Efficacy and dissolving Power thereof." Two meticulous members of the committee dissented as to the dissolving power, not as to the utility and efficacy.

So the £5,000 was paid to Joanna and her disclosures published in the *Gazette*. It thus appeared that, beyond a few charred herbs, there was no secret, only the soap and lime water. So, to support their faith and to prove their prowess, scientists gave battle as to the relative merits of the lime obtained from sea-shells and that from limestone and whether suds from Alicante soap were or were not preferable to those had from Castile. (Soap had been used in England but a century and the best still came from Spain.) Then followed the modifications, the "lixivia" of Hartley, of Hales, of Whytt, of Justin.

Within five years the treatment assumed quasi-official form in "An Essay on the

Virtues of Lime Water in the Cure of the Stone," by Robert Whytt, M.D., F.R.S., president of the Edinburgh Royal College of Medicine. He prescribed an ounce of soap and three pints of limewater a day. Of the soap he said pleasantly that not only is it "endued with a considerable Power of dissolving the Stone but likewise it will destroy all acid Humours of the Stomach and Guts and contribute greatly to keep the Belly easy and prevent Costiveness that might otherwise be occasioned by the Lime Water."

Meanwhile, in 1744, the prime minister, Robert Walpole, died miserably of an undiagnosed retention of urine. During his illness he had the misfortune to pass some gravel and so escaped from his surgeon, Ranby, long enough to permit Dr. Justin to make him a bit more miserable with lixivium and to draw from Ranby two priceless vituperative letters that recount the last illness and autopsy of the victim. Twelve years later Horace Walpole, brother to the minister (and not the epicure of Strawberry Hill) died peacefully with stone, though perhaps not of it, after having published in the second edition of Whytt an account of his "cure" by soap and limewater. They do say that when he was "opened," as the phrase was, the three stones found in his bladder were quite small.

Experiences of this sort plus publication of the mystery dissipated the novelty and threw doubt upon the infallibility of the cure but the faith of true believers remained unshaken. The last publication of David Hartley on the remedies seems to have appeared in 1746, the second edition of a Latin essay, reviewing the subject and citing, among others, six cases, puzzling to him, of persons whose symptoms had been relieved by the treatment, but who still had the stone. But Hartley was still enthusiastic over the grit that passed from his bladder in this, the ninth year of medication and expressed the hope that, with God's help, his symptoms, though not yet greatly diminished, would soon cease. They did after another ten years.

How helpful the creed was and how it withstood the factual shock is expressed by such contemporary authors as I have unearthed. When Edward Carteret died of apoplexy in 1743 he had twice been reported, as we would say, practically well, so the two stones they found in his bladder probably gave him little pain.

In Blackrie we read of a young shoemaker seven years a martyr to the stone who, between November 1756 and June 1757 ingurgitated 17 pounds weight of soap and 1500 pounds of limewater and "in three or four months after he began his Course found himself as easy as any Person who was never troubled with the Stone . . . and tho' when dismissed from the Hospital he forbore the Use of these Medicines and lived at large, eating plentifully of Salt and acrid Food which he was fond of, yet notwithstanding about three or four months afterwards . . . upon searching, the Stone was found in his bladder."

Perhaps as sagacious a comment as one encounters at this period is that of Benjamin Franklin who, in 1752, writes his brother, a stone man as Benjamin himself was later to be, "I have read Whytt on Lime Water. You desire my thoughts on what he says. But what can I say? He relates Facts and Experiments and these must be allowed good if not contradicted by other Facts and Experiments."

Joanna's fame must have persisted for much of her lifetime. The steps in its decline are a bit vague. The bigbugs doubtless took over and, like Whytt, emphasizing the limewater and using the soap, dimmed her luster. Leroi d'Etiolles has a good word for Joanna in 1825 and Sir Henry Thompson, one of the fathers of the modern school, mentions her in 1888.

* * *

But I have held you too long by the stony roadside of my beloved profession. To you, no doubt, what interest the story has is the confusion of motives we sense in Joanna and her followers. Was she anything more than a charlatan dazzled by the wonders of the soaping she gave the world? We do not know. And Hartley, how much did he get of the Five Thousand Pounds? We do not know. And the Rev. Stephen Hales, how did that lucid mind come to assent to the prevailing hysteria? Again, we do not know. And why Whytt "On Lime Water"?

Our scientific education has progressed much in the two centuries since Joanna flourished. Yet speed in transit and physical rather than intellectual illumination are all that most men have to show for this. We are better informed than our ancestors but we have less time to digest our information. The mob of men, even the mob of men of letters, remain uneducated because matters of moment and matters of the moment are not identical. We look outward, seeking novelty. Man is imprisoned in the external present.

These last words are Gilbert Murray's. Let me quote the paragraph in the *Religio Grammatici* in which they appear.

"Man is imprisoned in the external present and what we call a man's religion is, to a great extent, the thing that offers him a secret and permanent escape from that prison; a breaking of the prison walls that leaves him standing, of course, still in the present but in a present so enlarged and enfranchised that it is become not a prison but a free world. . . . And a scholar, I think, secures his freedom by keeping hold always of the past and treasuring up the best out of the past, so that in a present that requires resignation or courage he can call back the spirit with which brave men long ago faced the same evils. . . . The Psalms, turned into strange languages, their original meaning often lost, live on as a real influence in human life. . . . I know the figures in the tradition may be unreal, their words may be misinterpreted, but the communion is quite a real fact and the student, as he realizes this, feels himself one of a long line of torchbearers. He attains that which is the most compelling desire of every human being, a work in life which is worth living for and which is not cut short by the accident of his own death."

Let me add a thought implicit in Sir Gilbert's words. By his lifelong devotion to his work the student draws to himself unselfish friendships, friendships the intensity and selflessness of which no other human relation affords.

* * *

In the rather mixed tale you have listened to this evening, gentlemen, certain persons have been named to you who may have shared such joys. Franklin, surely; Hales, probably; Hartley, possibly; these had the scholar's creed. Excepting Franklin, we know little of their lives but they lived in the happy dawn of science, undistracted by the onrushing plane or by the iteration of radio or press. They possessed, more fully than we can hope to, a moment of peace after labor, that peace which the busy world filches from us.

Enviously I stand here tonight and, looking into your lives, see there this panacea, the scholar's creed, calculated to serve you a longer term of years than did the Joanna Stephens' medicines in their day. To each of you, kind sirs, it is my earnest wish that you live long and that this, your faith, abide with you.

* * *

Your Christian faith I have not the hand to touch nor the wit to argue. We are all aware that our doubting generation carries its investigations into Natural Theology only so far as to echo the most misleading words that Francis Thompson ever wrote:

> "I dimly guess what Time in mists confounds;
> Yet ever and anon the trumpet sounds
> From the hid battlements of Eternity.
> Those shaken mists unsettle, then
> Round the half-glimpsed turrets wash again."

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"Possession does not imply approval"

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[Phil., Chilton], 1942, 470 p.

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## *DEATHS OF FELLOWS*

HUEY, ARTHUR JOHN: 580 Park Avenue, New York City; born in Newark, New Jersey, April 12, 1880; died in New York City, September 29, 1942; graduated in medicine from New York University and Bellevue Hospital Medical College in 1902; elected a Fellow of the Academy March 6, 1919.

Dr. Huey was consulting otolaryngologist to the U. S. Public Health Service Marine Hospitals at Ellis Island and at Stapleton, Staten Island. He was a Fellow of the American Medical Association and a member of the State and County Medical Societies.

MALONEY, EDWARD ROBERT: 515 Park Avenue, New York City; born in Norwich, Connecticut, February 6, 1874; died in New York City, October 5, 1942; graduated in medicine from the College of Physicians and Surgeons, Columbia University, in 1896; elected a Fellow of the Academy February 5, 1920; served the Academy as Chairman of the Section of Dermatology and Syphilology, 1927-28; as a member of the Committee on Admission from 1939 through 1941; and, as Chairman of that Committee during 1941; he was also a member of the Council; and was a member of the Committee on Medical Information in 1942.

Dr. Maloney was emeritus professor of dermatology and syphilology at New York University College of Medicine, consulting dermatologist to Bellevue Hospital, Elizabeth A. Horton Memorial Hospital at Middletown, New York Foundling Hospital, New York Infirmary for Women and Children, Pilgrim State Hospital at Brentwood, and visiting dermatologist to the St. Vincent's Hosptial. He was a Fellow of the American Medical Association, a diplomate of the American Board of Dermatology and Syphilology, and a member of the American Academy of Dermatology and Syphilology, the American Dermatological Association, and the State and County Medical Societies.

In 1907 Dr. Maloney joined the National Guard of New York as Captain in the Medical Corps and in 1916 saw service on the Mexican border. In the first World War he served in Belgium and was promoted to the rank of Lieutenant-Colonel. In 1924 he was commissioned Colonel in the Medical Corps Reserve.

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